

Household Energy Consumption and Cost in Santa Fe County
Prepared for Local Energy by Dr. Kelly O'Donnell, October, 2004

This series of tables utilizes data from the 2000 US Census to estimate the share of income spent on household energy by residents of Santa Fe County and to examine the housing and socioeconomic factors that help determine the household energy burden. Several characteristics of Santa Fe County, including a large low income population and high cost of living relative to wages, make county residents financially vulnerable to fluctuations in home energy prices. For example, large increases in the price of natural gas, such as those experienced in 2001 and predicted for the winter of 2004/2005 may force many of the county's 40,000 low-income residents to choose between heating their homes and obtaining other necessities such as food or medicine. The financial vulnerability of Santa Fe County residents to fluctuations in energy prices is one of many reasons to decrease the county's reliance on non-renewable fuels, such as natural gas and electricity produced from coal.

According to the 2000 Census, there are roughly 678,000 occupied housing units in New Mexico, 52,500 (7.7%) of which are in Santa Fe County.

Table 1. Primary heating fuel of occupied housing units

	Santa Fe County		New Mexico	
	Housing units	Percent	Housing units	Percent
Gas from underground pipes	36,741	70.0%	458,661	67.7%
Gas bottled, tank, or LP	7,729	14.7%	98,440	14.5%
Electricity	5,100	9.7%	78,671	11.6%
Fuel oil or kerosene	84	0.2%	1,095	0.2%
Coal or coke	0	0.0%	628	0.1%
Wood	1,807	3.4%	34,666	5.1%
Solar Energy	774	1.5%	2,505	0.4%
Other fuel	178	0.3%	2,350	0.3%
No heating fuel	69	0.1%	955	0.1%
Total	52,482	100%	677,971	100.0%

Source: 2000 US Census Summary File 3 Table H 40

Natural gas from underground pipes ("utility gas" hereafter) is, by far, the most common home heating fuel in both Santa Fe County and New Mexico overall. Sixty eight percent of New Mexico residences and 70% of Santa Fe county residences use utility gas as their primary heating fuel. Just under 10% of Santa Fe County residences use electricity to heat, compared to 11.6% of residences statewide. Also noteworthy, the share of Santa Fe County residences that use wood to heat is lower than the statewide average and the share of Santa Fe county residences that

utilize solar energy for heat (1.5%), while small, is over three times higher than for the state overall (.4%).

New Mexico's population totals about 1.83 million. Santa Fe County is home to slightly over 7% of New Mexico residents, or about 129,300 people. Santa Fe is one of four New Mexico counties designated "urban" by the US Census Bureau¹.

Table 2. Population by primary heating fuel and rural, urban, or suburban residence

	New Mexico Counties				Santa Fe County
	All counties	Rural	Suburban	Urban	
Gas from underground pipes	66%	53%	68%	77%	72%
Gas bottled, tank, or LP	16%	23%	18%	9%	14%
Electricity	11%	12%	6%	11%	9%
Fuel oil or kerosene	0%	0%	0%	0%	0%
Wood	6%	10%	6%	2%	4%
Solar Energy	0%	0%	0%	0%	1%
Other fuel	0%	1%	3%	1%	0%
	100%	100%	100%	100%	100%

Source: 2000 US Census Public Use Microsample for New Mexico

In contrast to Table 1, which shows primary home heating fuel for occupied housing units (residences), Table 2 shows the number and percentage of New Mexico and Santa Fe County residents by primary home heating fuel and rural, suburban, or urban county of residence.

Comparison on the basis of population rather than housing units reveals that the percentage of New Mexicans that heat with utility gas (66%) is slightly lower than the percentage of New Mexico housing units heated with utility gas (68%). in Santa Fe County, however, the percentage of residents that heat with utility gas (72%) exceeds the percentage of homes that are heated with utility gas (70%). This implies that on average, New Mexico households that heat with natural gas are slightly smaller than those that don't; but that in Santa Fe county households that heat with natural gas are larger than those that don't.

Residents of Santa Fe county are somewhat more likely (72%) than other New Mexico residents (66%) to live in a house heated with utility gas but somewhat less likely than residents of other urban counties in New Mexico (77%) to heat with

¹ New Mexico's three other urban counties are Los Alamos, Bernalillo, and Dona Ana. Valencia and Sandoval Counties are "suburban," the remaining 26 counties are "rural."

utility gas. Santa Fe county residents are more likely (14%) than residents of other urban counties (9%) to heat with propane or other bottled gas.

New Mexico has one of the nation's highest poverty rates. Roughly one-in-five New Mexico residents live in poverty². Twelve percent of Santa Fe county residents live in poverty, giving Santa Fe County the second lowest poverty rate of all New Mexico counties and making Santa Fe one of only two New Mexico counties with a poverty rate lower than the national average. However, a full 31% of Santa Fe county residents live in "low income" households, households with income less than twice the federal poverty threshold. Thus, almost one-third of the County's population is vulnerable to economic hardship resulting from wide swings in energy costs.

Table 3. Percent of state and county residents by home heating fuel and poverty status³

	Income as a percent of the federal poverty threshold							
	Under 100%		100%-199%		200%-299%		300% and over	
	NM	Santa Fe	NM	Santa Fe	NM	Santa Fe	NM	Santa Fe
Gas from underground pipes	56.6%	69.3%	62.0%	70.0%	67.2%	71.5%	71.9%	72.8%
Gas bottled, tank, or LP	18.4%	11.4%	19.1%	13.0%	15.9%	13.8%	12.6%	14.6%
Electricity	12.2%	10.4%	10.9%	11.5%	11.3%	10.7%	10.8%	6.6%
Fuel oil or kerosene	0.4%	0.0%	0.2%	0.3%	0.2%	0.0%	0.2%	0.2%
Wood	11.3%	8.1%	6.9%	3.7%	4.7%	3.5%	3.4%	3.0%
Solar Energy	0.2%	0.0%	0.2%	0.6%	0.2%	0.3%	0.5%	2.3%
Other fuel	0.3%	0.5%	0.3%	0.5%	0.3%	0.3%	0.5%	0.5%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Source: 2000 US Census Public Use Microsample for New Mexico

Table 3 shows that the percent of New Mexicans that heat with utility gas increases with income - it is 56.6% for New Mexicans living in poverty and 71.9% for those at or above 300% of the poverty level. The same is true for residents of Santa Fe County, although the trend is not nearly as pronounced. About 69% of impoverished Santa Fe County residents heat with utility gas, while 73% of Santa Fe County residents with income at or above 300% of the federal poverty level heat with utility gas.

² Poverty is defined as an income below 100% of the federal poverty level (FPL). However, the inadequacy of the FPL as gauge of economic hardship has long been recognized, and it is generally accepted that households with income less than twice (200%) of the poverty threshold are unable to afford at least some basic necessities, such as food, medical care, adequate housing or energy.

³ Poverty status is preferable to household income as a measure of available financial resources because poverty status is a function of both income and household size. Poverty status does not, however, take into account expenses.

In Santa Fe County, the percent of people that heat with bottled gas also increases with income, increasing from 11.4% for those living in poverty to 14.6% for those at or above 300% of the poverty level. In contrast, the percent of residents that heat with electricity declines with income, 10.4% of poor county residents heat with electricity, compared to 6.6% of middle and upper income residents.

Energy burden is estimated as the percentage of household income spent on gas, electricity, and heating fuels, such as wood and kerosene. The energy costs used in the calculation of energy burden include those for household uses such as cooking and cooling as well as heating. They do not, however, include transportation fuel costs.

Table 4. Average annual household energy costs and energy burden by household heating fuel

	New Mexico		Santa Fe	
	cost	burden	cost	burden
Gas from underground pipes	\$1,390	4.7%	\$1,476	3.7%
Gas bottled, tank, or LP	\$1,675	6.6%	\$1,978	5.2%
Electricity	\$1,224	4.5%	\$1,238	3.9%
Wood	\$1,475	7.6%	\$1,780	6.6%
Solar Energy	\$1,160	3.7%	\$1,158	1.6%
Total	\$1,422	5.1%	\$1,530	4.0%

Source: 2000 US Census Public Use Microsample for New Mexico

The share of household income spent on household energy average 5.1% for New Mexico and 4.0% for Santa Fe County. The lower burden in Santa Fe County is due, in large part, to the county's higher-than-average incomes and lower-than-average poverty rates, although the greater use of solar energy is also a factor.

In both New Mexico and Santa Fe County, households that heat primarily with wood bear the largest energy burden. Households that heat with wood are more likely to than other households to be impoverished. Households that heat with bottled gas also spend a large share of income on home energy.

Table 5. Average annual household energy costs and energy burden for low income and fixed income households

	New Mexico		Santa Fe	
	cost	burden	cost	burden
Low income*	\$1,268	8.7%	\$1,288	8.1%
Fixed income	\$1,358	6.9%	\$1,552	5.7%

* Income less than 200% of the federal poverty level

Source: 2000 US Census Public Use Microsample for New Mexico

Low income and fixed income New Mexicans are particularly vulnerable to energy price fluctuations. For purposes of these tables, "low income" New Mexicans are defined as people in households with income less than twice the poverty threshold and "fixed income" New Mexicans are defined as people who are over 65 and/or disabled who are not in the labor force.

Table 6 gives percentile home energy burdens for New Mexico and Santa Fe County. The 50th percentile (median) home energy burden is 3% for New Mexico and 2% for Santa Fe County. The 75th percentile home energy burden is 6% for New Mexico overall and 4% for Santa Fe County. This means that 75% of New Mexicans live in households that spend less than 6% of gross income on household energy and 75% of Santa Fe County residents live in households that spend less than 4% of gross income on household energy.

Table 6. Home energy burden percentiles

Percentile	Home Energy Burden	
	New Mexico	Santa Fe
25 th	2%	1%
50 th	3%	2%
75 th	6%	4%

Home energy burden is defined as the ratio of home energy costs to household income. There appears to be no energy burden threshold beyond which home energy is consistently defined as "unaffordable" in the literature. However, an affordability threshold of 6% (the 75th percentile burden for New Mexico) is not inconsistent with assumptions made by other researchers.

Table 7. Percent of population in households with energy burden over 6% by heating fuel type

	Santa Fe		New Mexico	
	Frequency	Percent	Frequency	Percent
Gas from underground pipes	15,724	15%	231,075	20%
Gas bottled, tank, or LP	3,977	20%	92,112	34%
Electricity	2,145	17%	35,784	18%
Wood	1,705	32%	38,420	38%
Solar Energy	67	3%	664	12%
Other	118	0%	2,580	27%
Total	23,785	17%	402,180	23%

Source: 2000 US Census Public Use Microsample for New Mexico

Roughly one-quarter of New Mexico residents (about 402,000 people) spend more than 6% of household income on energy. In Santa Fe roughly 23,800 (17%) people live in households that spend over 6% of gross income on household energy.

Table 8. Average annual household energy costs and energy burden by race/ethnicity

	New Mexico		Santa Fe	
	cost	burden	cost	burden
White non-Hispanic	\$1,441	4.2%	\$1,700	3.7%
Hispanic	\$1,420	5.9%	\$1,468	4.6%
African American	\$1,153	4.7%	\$1,257	3.0%
Native American	\$1,414	6.9%	\$1,690	7.6%

Source: 2000 US Census Public Use Microsample for New Mexico

In both Santa Fe County and New Mexico overall, Native Americans have the highest average household energy burden. The average household energy burden for Native American residents of Santa Fe County is considerably higher than the average household energy burden for New Mexico Native Americans overall. High home energy burdens for New Mexico Native Americans result, in large part, from lower-than-average incomes. However, greater usage of wood and bottled gas also contribute to above-average energy costs.

No significant difference in household energy burden across genders was found for either New Mexico or Santa Fe County.

Analysis of household energy burden by age shows that that household energy expenditures by New Mexico seniors average 6.1% of income. Santa Fe County seniors spend an average 5% of their income on home energy. Thirty one percent

of New Mexico seniors and 24% of Santa Fe County seniors live in households with home energy burdens in excess of 6%.

Table 9. Average annual household energy costs and energy burden by housing type

	New Mexico			Santa Fe County		
	residents	cost	burden	residents	cost	burden
Mobile home	357,684	\$ 1,412	6%	24,483	\$ 1,413	5%
Detached one-family house	1,132,941	\$ 1,556	5%	94,140	\$ 1,722	4%
Attached one-family house	71,828	\$ 1,197	5%	7,867	\$ 1,454	5%
Duplex	23,847	\$ 927	6%	2,625	\$ 1,130	4%
Apt building more than 2 apts	162,108	\$ 697	4%	15,131	\$ 651	3%
Boat, RV, or van	3,213	\$ 700	4%	227	\$ 707	4%

Source: 2000 US Census Public Use Microsample for New Mexico

In both New Mexico and Santa Fe County overall, average annual home energy costs are highest for residents of detached single-family homes. However, energy burden is highest for residents of mobile homes and duplexes.

Table 10. Average annual household energy costs and energy burden by housing tenure

	New Mexico			Santa Fe County		
	residents	burden	cost	residents	burden	cost
Owned, with mortgage	868,058	4%	\$ 1,608	79,958	3%	\$ 1,684
Owned free and clear	414,105	6%	\$ 1,493	29,538	5%	\$ 1,738
Rented	417,053	6%	\$ 1,034	32,547	4%	\$ 998
Occupied, not rented or owned by residents	52,405	6%	\$ 871	2,430	5%	\$ 1,081

Source: 2000 US Census Public Use Microsample for New Mexico

Average home energy burden is lowest for homes that are owned with a mortgage. The higher energy burden for homes owned outright by their residents is due, in part, to the fact that many of these homes are mobile homes.

Table 11. Average annual household energy costs and energy burden by home value

	New Mexico				Santa Fe			
	residents	cost	burden %	% over 6%	residents	cost	burden %	% over 6%
Under \$10,000	51,227	\$ 1,120	7%	38%	2,141	\$ 1,037	6%	25%
\$10,000 - \$49,999	254,128	\$ 1,380	7%	33%	10,672	\$ 1,396	5%	27%
\$50,000- \$100,000	393,375	\$ 1,492	5%	23%	13,029	\$ 1,666	5%	20%
\$100,000-\$149,999	282,654	\$ 1,619	4%	15%	20,806	\$ 1,718	5%	20%
\$150,000 -\$199,999	139,073	\$ 1,695	4%	12%	19,764	\$ 1,475	3%	9%
Over \$200,000	161,706	\$ 2,016	4%	13%	43,084	\$ 1,909	3%	12%

Source: 2000 US Census Public Use Microsample for New Mexico

Not surprisingly, in both New Mexico and Santa Fe County, higher home values are associated with higher average energy costs and lower average energy burdens.

Table 12. Average annual household energy costs and energy burden for residents of agricultural properties

	cost	burden	% with burden over 6%
Santa Fe County	\$1,750	4%	12%
New Mexico	\$1,732	5.2%	24%

Source: 2000 US Census Public Use Microsample for New Mexico

In New Mexico and Santa Fe County, average household energy costs are higher for agricultural properties, but energy burden is about average.

Ninety four percent of New Mexico households and 95% of Santa Fe County households own at least one motor vehicle. The vast majority of New Mexicans that work outside the home commute by car. Seventy nine percent of New Mexico commuters and 77% of Santa Fe commuters drive alone to work.

Table 13. Commuting patterns

	New Mexico		Santa Fe County	
	number	percent	number	percent
Car, truck, or van:	687,676	95%	55,560	94%
Drove alone	575,187	79%	45,449	77%
Carpooled	112,489	15%	10,111	17%
Travel time over 1/2 hour	190,289	26%	16,853	29%

Source: 2000 US Census Public Use Microsample for New Mexico

Future research

The data presented in the preceding tables provide valuable information about energy consumption by residents of Santa Fe County and New Mexico overall. As such, these tables could serve as the foundation for a comprehensive residential energy burden analysis for Santa Fe County that includes transportation costs and incorporates data from LIHEAP, the New Mexico Public Regulatory Commission, Public Service Company of New Mexico, and HUD to create a more detailed and precise picture of energy consumption and cost for Santa Fe County residents. The comprehensive energy burden study could stand alone, or be used to model the distributional impact of various energy price shock and/or energy conservation/efficiency scenarios.

Santa Fe County is a net importer of energy. Localized energy production from renewable sources is predicted to create jobs and economic stimulus in the communities that adopt it. Future economic research could analyze the impact on the Santa Fe economy of widespread localized energy production with or without an accompanying conservation and/or efficiency initiative. Such an analysis could place special emphasis on localized energy production as a driver of sustainable economic development within disadvantaged communities.

Addendum

(1) Use Census data to estimate percent of wages from project construction and maintenance that would leave Santa Fe

General information

81.4% (65,400) of the approximately 80,400 people who work in the Santa Fe/Los Alamos MSA live in either Santa Fe or Los Alamos counties. Of the roughly 15,000 workers who commute into Santa Fe/Los Alamos: 61% (9,000) live in either Rio Arriba, Taos, San Miguel, Mora, or Guadalupe counties; 14% (2,100) reside in Sandoval county; and 21% (3,200) reside in Bernalillo county.

Seventeen percent of Santa Fe/Los Alamos commuters work in construction; another 17% of commuters are teachers. The remaining 66% of commuters to Santa Fe/Los Alamos are widely dispersed across a number of occupations, many of which are associated with government and/or research.

Construction

Thirty one percent of construction workers employed in Santa Fe county reside outside the county. We can therefore assume that *roughly* 31% of the wages and salaries associated with new construction in Santa Fe would leave Santa Fe county⁴.

Utilities

According to Census data, approximately 40% of utility workers employed in Santa Fe/ Los Alamos reside outside the two counties. However, the number of people reporting that they work for a utility in Santa Fe/ Los Alamos is extremely small and therefore statistics for this population will be unreliable. It would be safer to simply assume that the share of wages and salaries associated with system maintenance that would remain within the county economy is roughly comparable to that for construction (69%).

(2) CHARACTERISTICS OF HOUSEHOLDS THAT HEAT WITH WOOD

Approximately 1,800 Santa Fe county households, totaling roughly 5,400 residents, (3.7% of the county's population) heat primarily with wood. Santa Fe County residents that heat with wood differ significantly from wood-heaters elsewhere in New Mexico. For example, Santa Feans that heat with wood are far less likely than

⁴ It is likely that commuters from outside the county spend a portion of their income in Santa Fe. Thus, 31% is an upper bound estimate of the share of construction income that would leave the county economy.

other New Mexico wood-heaters to be Native American and they considerably less likely than wood-heaters elsewhere in New Mexico to be low income.

Eighty percent of Santa Fe County homes heated primarily with wood are owner-occupied. Sixty percent of Santa Fe County homes heated primarily with wood are detached single-family houses. Twenty percent are mobile homes. In New Mexico overall, 17% of wood-heaters live in mobile homes.

Table 1. Race and ethnicity of residents that heat primarily with wood

	Santa Fe		New Mexico	
	number	percent	number	percent
White non-Hispanic	2,502	47%	24,267	25%
Hispanic, all races	2,667	50%	30,240	31%
African American	0	0%	403	0%
Asian	12	0%	90	0%
Native American	184	3%	42,627	44%
Total	5,365	100%	97,627	100%

Forty four percent of New Mexicans that heat with wood are Native American. In Santa Fe County, only 3% of residents that heat primarily with wood are Native American. This difference is due, in part, to Santa Fe County's relatively small Native American population. New Mexico's population is roughly 10% Native American. In contrast, only about 3% of Santa Fe County residents are Native American. However, Native Americans living in Santa Fe County are also far less likely than Native Americans elsewhere in New Mexico to heat with wood.

Chart 1. New Mexico Native Americans by household heating fuel type

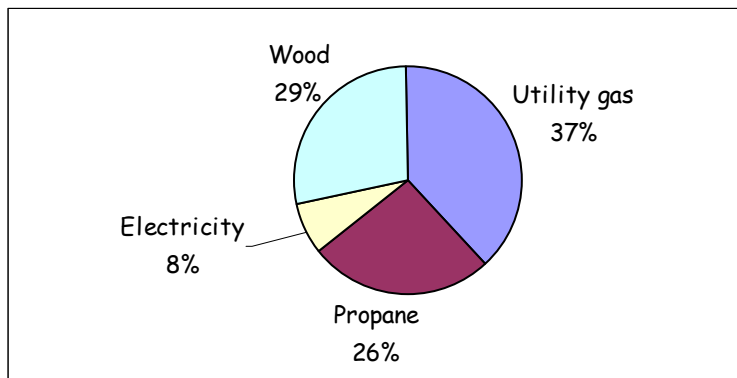


Chart 2. Santa Fe County Native Americans by household heating fuel type

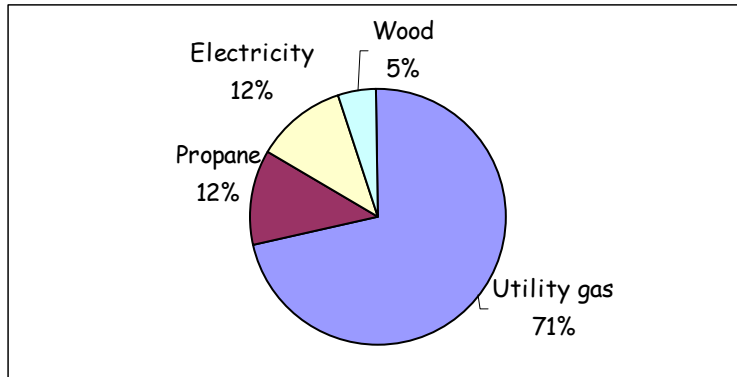


Table 2. Households that heat with wood, percent that pay for natural gas and electricity

	Heat with wood		Everyone	
	Santa Fe	New Mexico	Santa Fe	New Mexico
Natural gas	68%	67%	88%	86%
Electricity	96%	91%	95%	94%

Ninety six percent of Santa Fe County residents and 91% of New Mexicans that heat with wood also pay for electricity. The percentage of Santa Fe wood-heaters that pay for electricity is roughly comparable to the overall population (96% and 95%, respectively). However, in New Mexico overall, the share of wood-heaters that pay for electricity is 3% lower than for the overall population.

Sixty eight percent of Santa Fe County residents and 67% of New Mexicans that heat with wood also pay for natural gas. These data suggest that wood is a partial substitute for natural gas in both Santa Fe and New Mexico overall.

The average energy burden of Santa Fe County households that heat with wood is significantly higher than the average energy burden for Santa Fe County households overall. The higher-than-average energy burden for wood-heaters is attributable, at least in part, to higher-than-average electricity bills, suggesting that Santa Fe County households that heat primarily with wood also utilize electric heaters. In New Mexico overall, the average electricity bills of households that heat with wood do not differ significantly from the statewide average.

Table 3a. Average expenditure (\$) of residents of households that heat primarily with wood and all households

	Santa Fe County		New Mexico	
	Wood-heaters	All	Wood-heaters	All
Avg energy expenditure	\$1,776	\$1,544	\$1,475	\$1,435
Electricity	\$982	\$843	\$794	\$804
Natural gas	\$364	\$627	\$354	\$577
Other fuels (incl wood)	\$464	\$74	\$327	\$54

Table 3b. Average expenditure (\$), cost share by heating fuel type (%), and household energy burden of residents for households that heat primarily with wood and all households.

	Santa Fe County		New Mexico	
	Wood-heaters	All	Wood-heaters	All
Avg energy expenditure	\$1,776	\$1,544	\$1,475	\$1,435
% electricity	55%	53%	54%	56%
% natural gas	19%	42%	24%	40%
% other fuels (includes wood)	26%	5%	22%	4%
Avg HH energy burden	7%	4%	8%	5%

Santa Fe County residents that heat primarily with wood tend to have significantly higher incomes than wood-heaters statewide. Forty seven percent of Santa Fe residents that heat primarily with wood are middle or upper income (defined here as having income at least three times the poverty threshold), compared to 23% of wood heaters statewide.

Chart 3. Income relative to the poverty level of Santa Fe County residents that heat primarily with wood

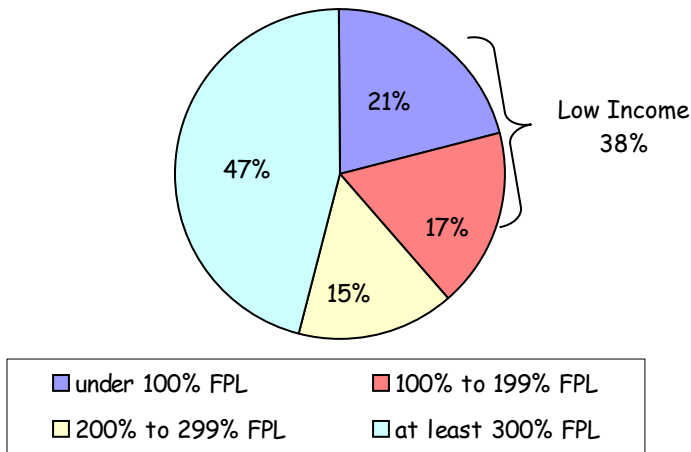


Chart 4. Income relative to the poverty level of New Mexico residents who heat primarily with wood

