

Heating Fuel Type (2000 Census)	Number of Households in Caroline - 2000 Census	Adjustment for # of Households in Caroline - 2010 Census	Estimated 2010 Town of Caroline Consumption for Heating (BTUs)*	Estimated Consumption Adjusted for Average Household Size***
Total - Occupied housing units*	1,162	1,403	164,012,980,000	139,886,670,642
Utility (natural) gas	287	347	40,509,230,000	34,550,322,267
Bottled, tank, or LP gas	173	209	24,418,455,714	20,826,500,879
Electricity **	132	159	18,631,422,857	15,890,740,555
Fuel oil, kerosene, etc	305	368	43,049,878,571	36,717,241,434
Coal or coke	24	29	3,387,531,429	2,889,225,555
Wood	232	280	32,746,137,143	27,929,180,369
Solar energy	-	-	n/a	
Other fuel	9	11	1,270,324,286	1,083,459,583

\* Based on total New York State BTUs consumed (.88 quadrillion BTU - Table 1, pt. 1, Table 4) and proportion of Town of Caroline housing units to total number of housing units in State

\*\* Conversion between kWh and BTU is: 3,412 Btu per kWh,

\*\*\* Household size in Caroline in 2010 is 2.32 persons, versus New York Average Household size in 2005 RECS tables of 2.72 persons

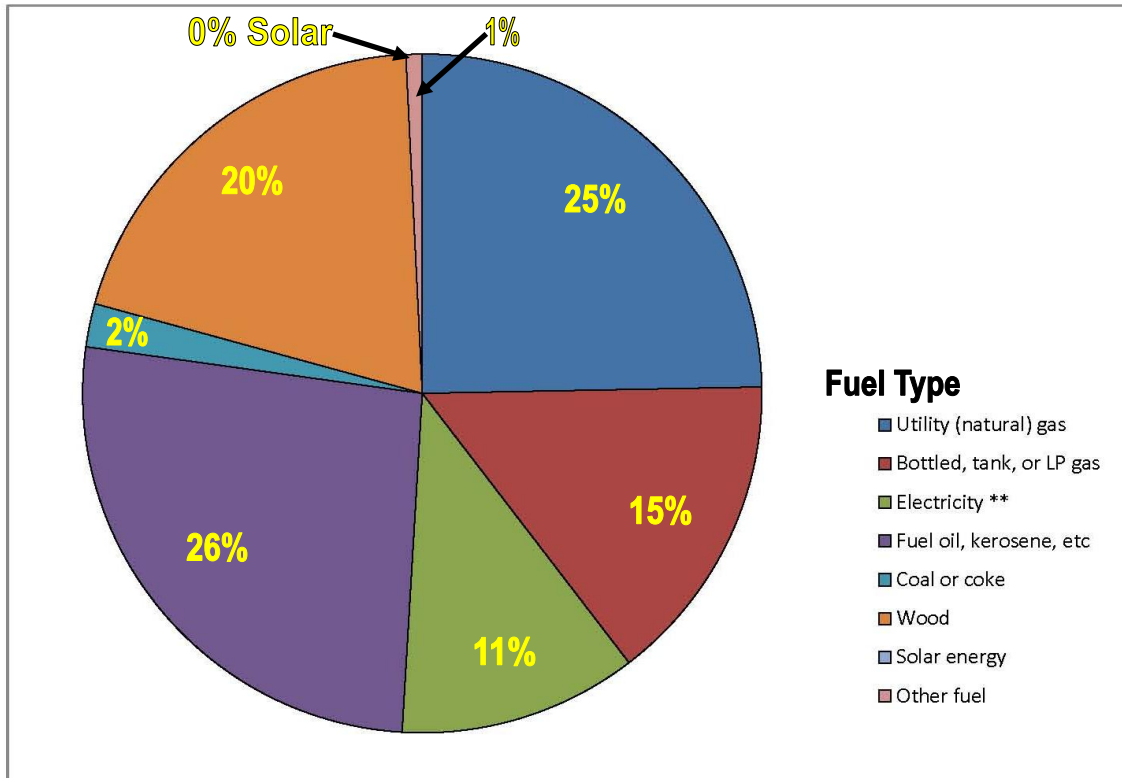
Source for BTU data: Energy Information Administration, Office of Energy Markets and End Use

**Table 1. Estimated Town of Caroline Residential Energy Consumption by Fuel Based on 2005 Residential Energy Consumption Survey (RECS) for New York State**

Table 1 above shows total energy consumption per household by fuel type. In the original study the above data was interpreted as being for heating only. Also when the data was being copied over from the Residential Energy Consumption Survey (RECS) Table 1 and Table 4, there was a typographical error that placed total consumption statewide in New York at .88 quadrillion BTUs instead of .83 quadrillion BTUs. As a result the total estimated BTUs for Caroline as corrected dropped from 173.9 billion BTUs to 164.0 billion BTUs. With the adjustment for smaller household size, the total estimated BTUs consumed for residential purposes in Caroline is 139.9 billion BTUs.

Figure 1 below breaks down consumption by fuel type.

The estimated energy consumption for Caroline (unadjusted for household size) is lower than the original total estimated energy consumption in Caroline of 209 billion BTUs that I showed October 17<sup>th</sup>. The elimination of what was effectively double counting of energy utilized for non-heating purposes in Caroline resulted in the reduction of 45 billion BTUs, to 164.0 billion BTUs.



**Figure 1. Total estimated energy consumption in Town of Caroline, by fuel type**

Energy Uses	Number of Households in Caroline - 2000 Census	Adjustment for # of Households in Caroline - 2010 Census	Estimated 2010 Town of Caroline Consumption (BTUs)*	Estimated Consumption (BTUs) Adjusted for Average Household Size***	Use as Percent of Total
Total - Occupied housing units*	1,162	1,403			
<b>Non-Heating Uses</b>					
Air Conditioning			3,952,112,676	3,370,756,901	2%
Water heating			29,640,845,070	25,280,676,761	18%
Refrigerators			5,928,169,014	5,056,135,352	4%
Other Appliances & Lighting			31,616,901,408	26,966,055,211	19%
<b>Subtotal - Non-Heating Uses</b>			<b>71,138,028,169</b>	<b>60,673,624,225</b>	<b>43%</b>
<b>Space Heating Use</b>			<b>92,874,647,887</b>	<b>79,212,787,183</b>	<b>57%</b>
<b>Total Energy Use - Occupied Housing Units</b>			<b>164,012,676,056</b>	<b>139,886,411,408</b>	<b>100%</b>

\* Based on total New York State BTUs consumed (.36 quadrillion BTU - Table 12) and proportion of Town of Caroline housing units to total number of housing units in State

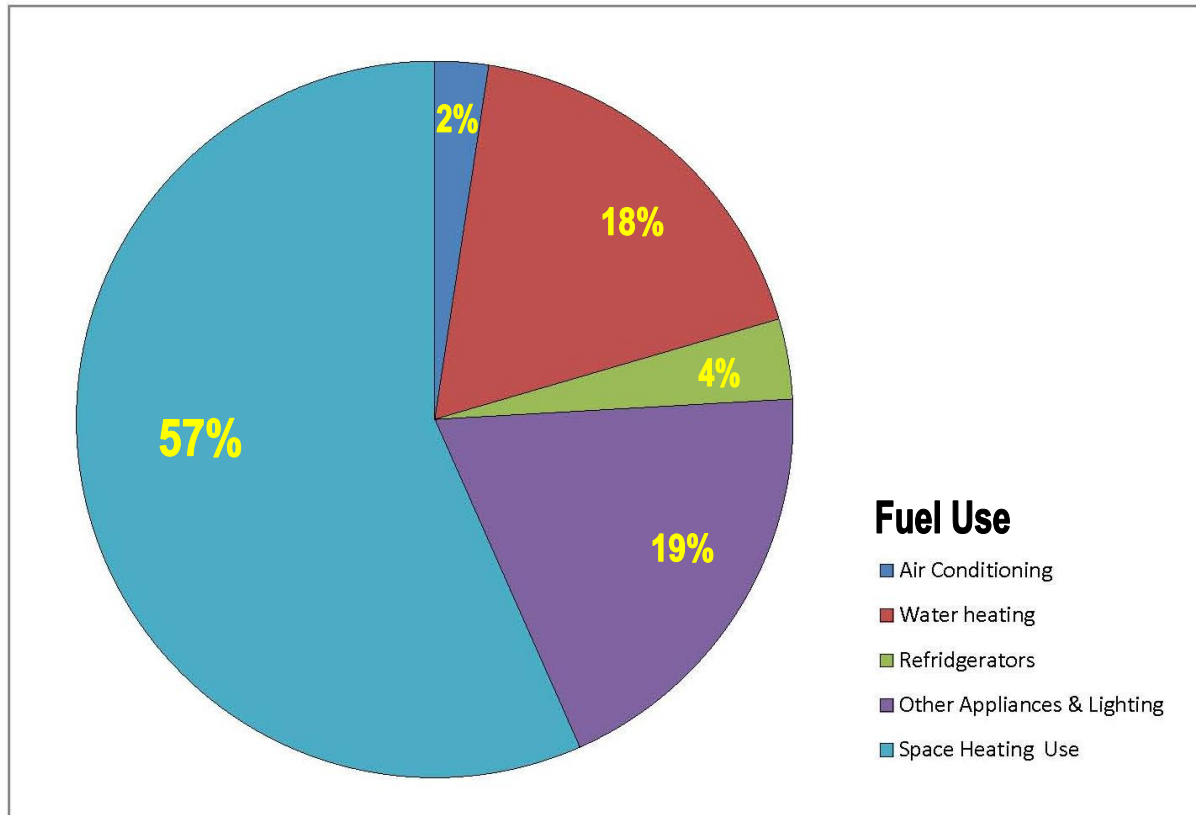
\*\* Conversion between kWh and BTU is: 3,412 Btu per kWh,

\*\*\* Household size in Caroline in 2010 is 2.32 persons, versus New York Average Household size in 2005 RECS tables of 2.72 persons

Source for BTU data: Energy Information Administration, Office of Energy Markets and End Use

**Table 2. Estimated Town of Caroline Residential Energy Consumption for Heating & Non-Heating Uses Based on 2005 (RECS) Data for New York State**

Table 2 and Figure 2 show the total estimated fuel consumption for space heating and non-space heating purposes as adjusted to reflect the corrections to Table 1 above. Fuel consumed for the purpose of space heating accounts for 57% of BTUs consumed for residential purposes in Caroline.



**Figure 2. Estimated Town of Caroline Residential Energy Consumption for Heating & Non-Heating Uses**

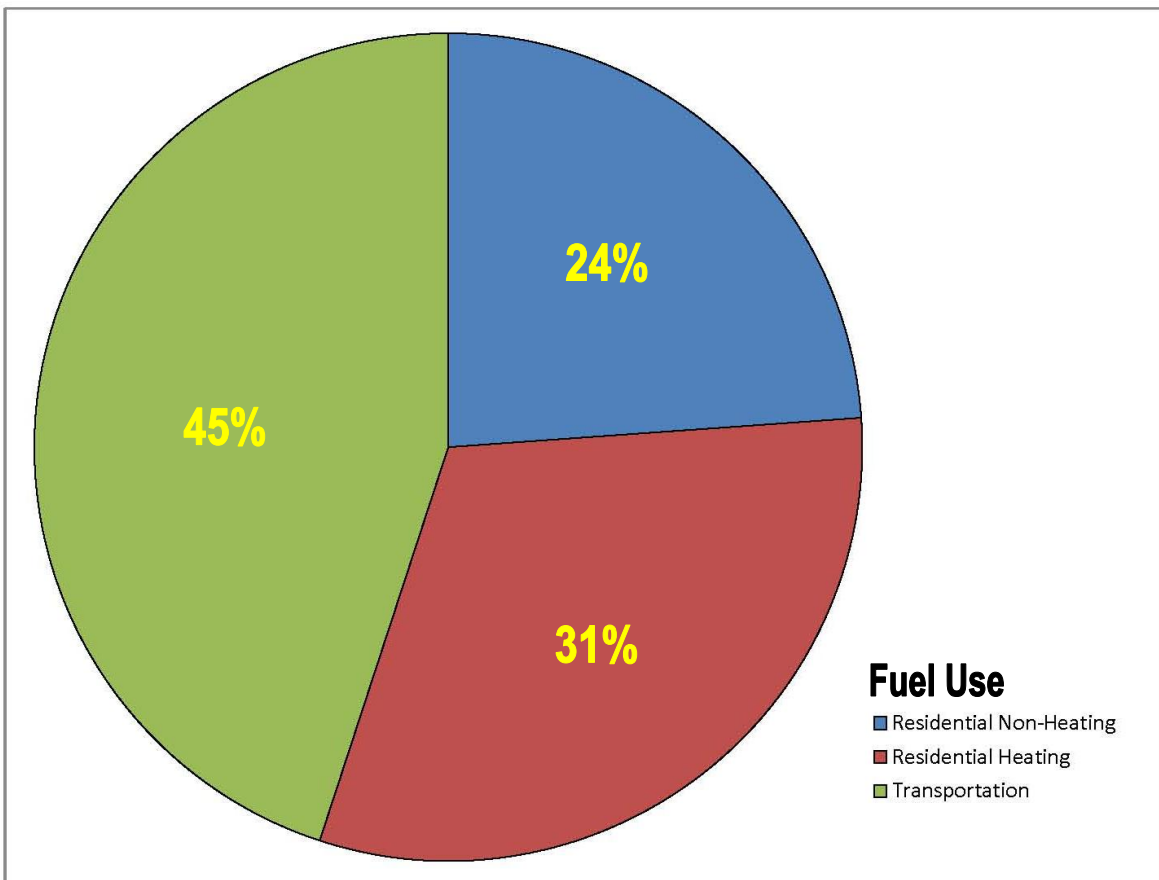
Table 3 and Figure 3 show total estimated energy use for residential purposes in the Town of Caroline, including energy used in personal transportation. The estimated number of BTUs consumed in transportation is based on Vehicle Miles Traveled (VMT) data supplied by the Ithaca-Tompkins County Transportation Council, and average vehicle gas mileage nationwide for automobiles and 2-axle light trucks as provided in the TRANSPORTATION ENERGY DATA BOOK: EDITION 30.

According to the Ithaca-Tomkins County Transportation Council Caroline residents travel an estimated 23.9 million miles annually. As shown below, transportation is the single largest

component of energy consumption by Caroline residents. It accounts for an estimated 45% of residential energy consumption.

	BTUs	%
Residential Non-Heating	71,138,028,169	24%
Residential Heating	92,874,647,887	31%
Transportation	134,046,066,000	45%
Total	298,058,742,056	

**Table 3. Caroline Estimated Total Residential Energy Use Including Transportation**



**Figure 3. Caroline Estimated Total Residential Energy Use Including Transportation**

### **Question regarding household sizes in New York City.**

At the October 17 meeting a question was raised regarding whether or not larger household sizes in New York City might be the reason for the larger average household size of 2.72 persons per household for the state of New York as a whole used in the 2005 RECS. According to the 2010 Census of Population and Housing, the average household size in New York City is only 2.57 persons per household, above the average household size of 2.32 persons for Caroline, but still well below the state average.

The question also raises another issue: the 2.72 persons per household listed in the RECS tables is substantially higher than the average household size listed for the state as a whole in the 2010 Census tables. The Census shows an average household size of 2.61 persons, roughly 4% smaller than the average household size in the RECS tables. There is nothing in the RECS data to suggest otherwise, so I have assumed that this larger household size is reflective of the households surveyed for the RECS.