

# The Energy Cost Burden in Vermont

Research in progress May 2014 early thoughts

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## Common Definitions:

quantity of energy purchased  $\times$  price of energy  
= spending on energy



spending on energy / income = energy burden

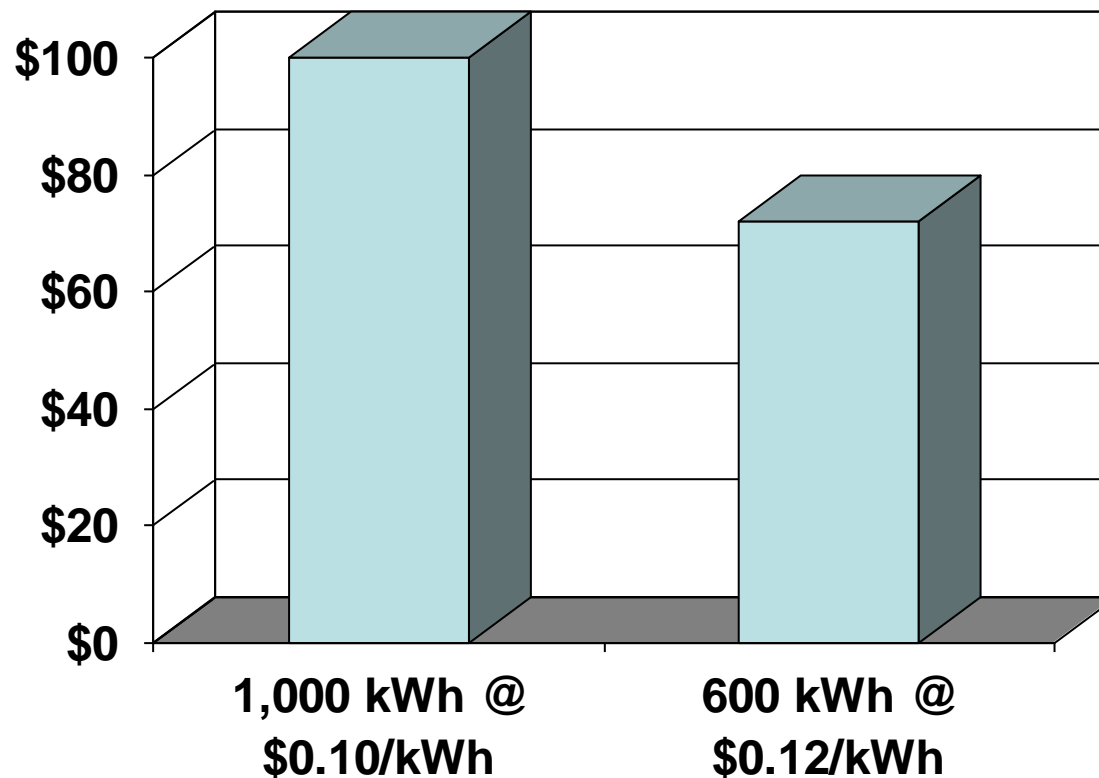
energy burden  $>$  10% of income = “fuel poverty”



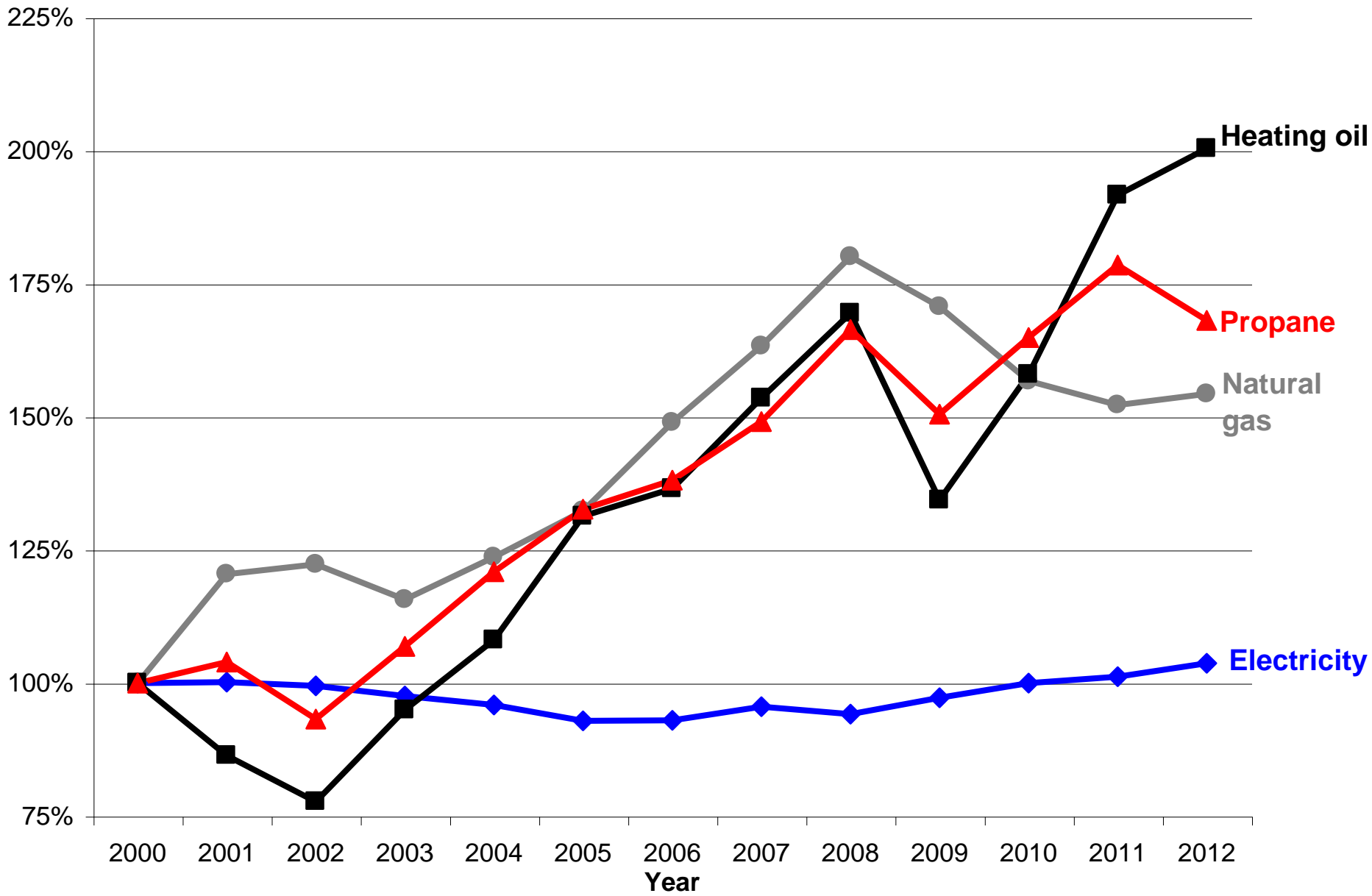
Note: measurements throughout are of energy use within the household only. Transportation energy is excluded.

# Price vs. Cost: The "Rates vs Bills" Debates

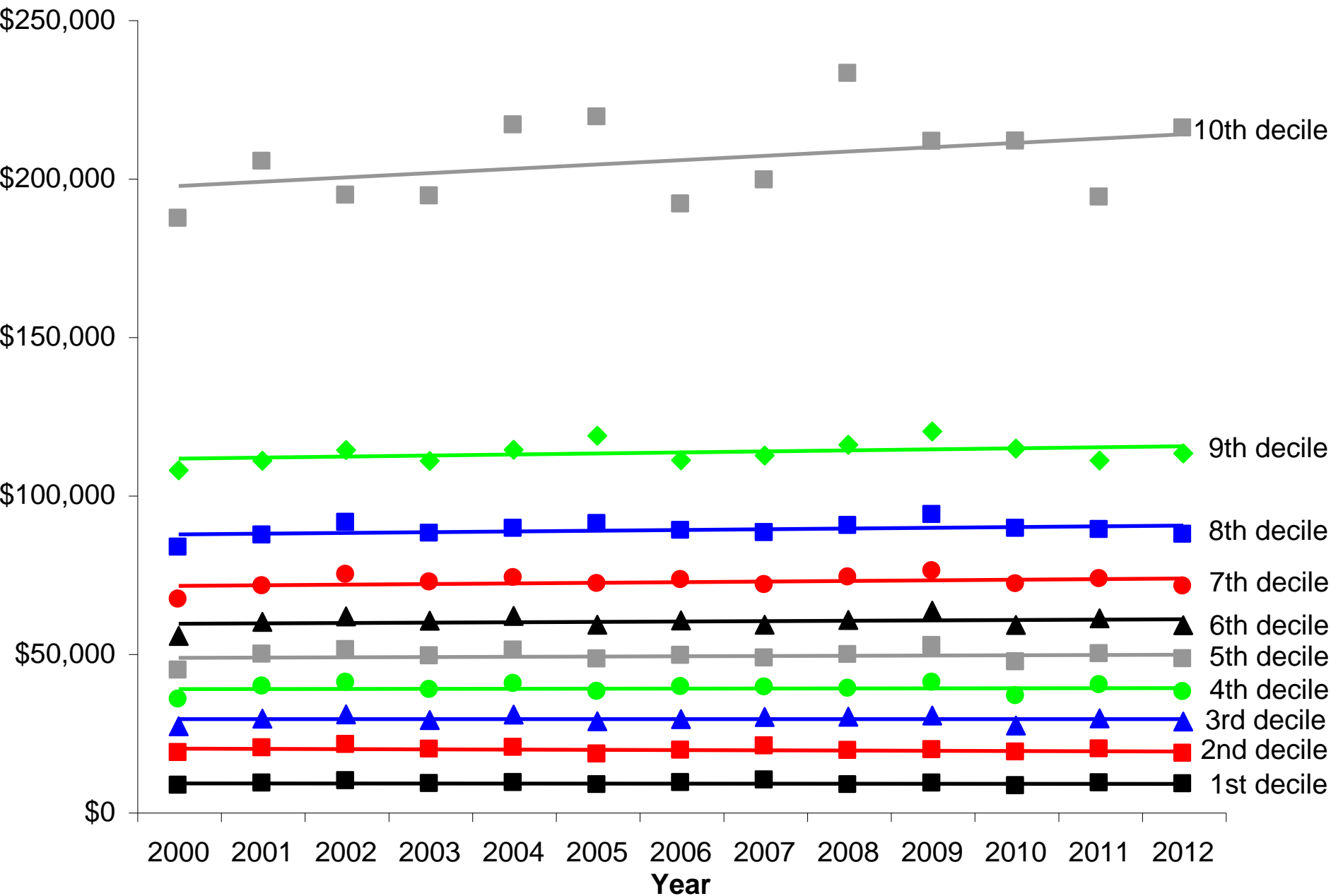
What you spend for energy depends on both prices and quantities.  
In practice, energy is more affordable if efficiency gains outweigh price hikes.



# Change in Vermont retail real energy prices, 2000-2012



# Average household incomes (2013 USD\$) in VT by decile, 2000-2012



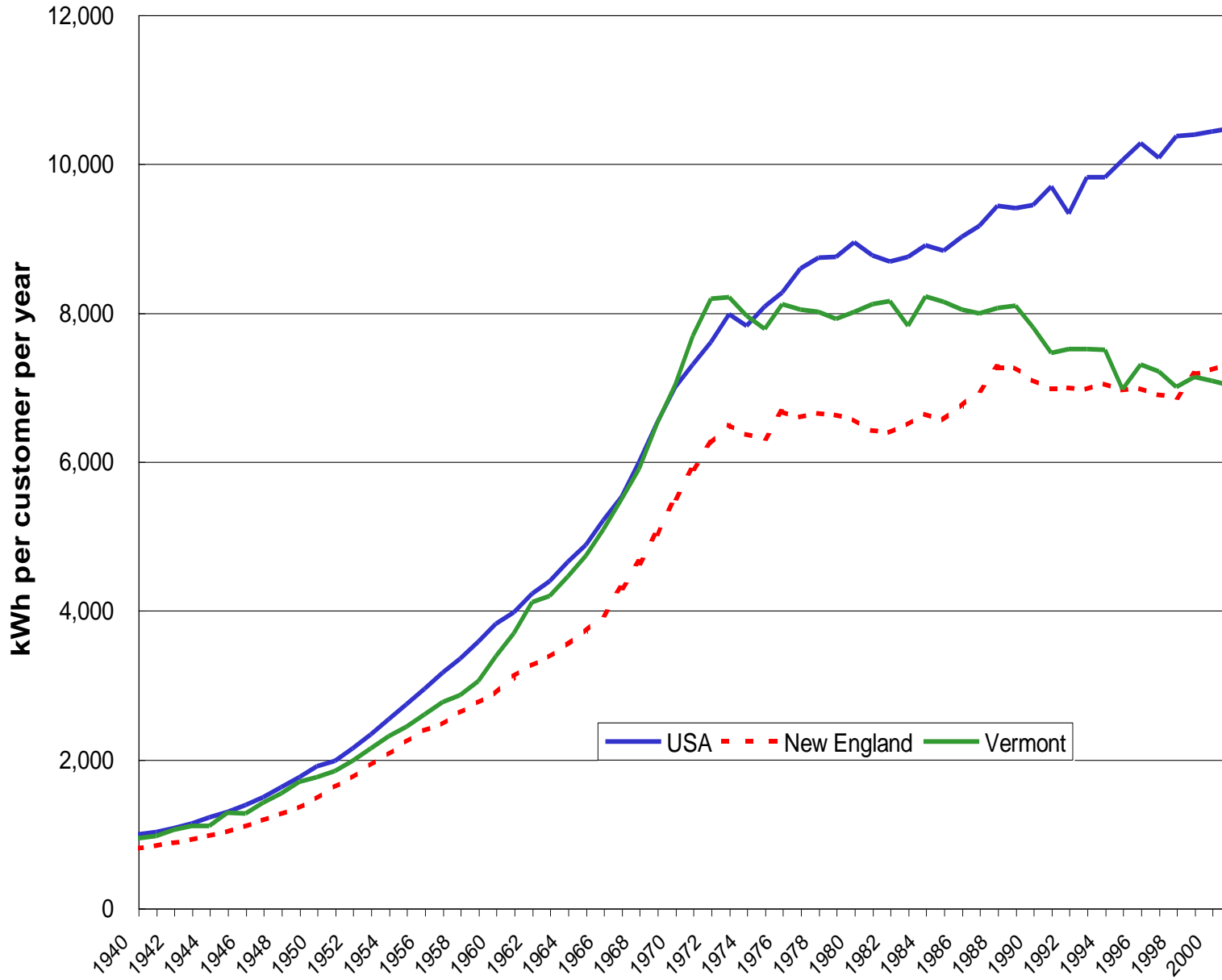
## Electricity consumption\*, 2000-2012

Decile	Average annual kWhs	Average annual change in consumption as % of that in 2000	Average annual change in real \$/kWh
Richest	10,166	-0.8%	0.3%
9th	9,254	-0.2%	
8th	9,096	0.3%	
7th	8,464	0.1%	
6th	8,444	-0.1%	
5th	7,836	0.5%	
4th	7,551	0.6%	
3rd	7,104	0.7%	
2nd	7,149	1.0%	
Poorest	6,594	0.8%	
Avg. -0.1%			
Avg. 0.7%			

\* Counts only households using electricity and paying directly, not through rent.

# Residential Electricity Use

## kWh per customer per year, 1940-2001



## Natural gas consumption\*, 2000-2012

Decile	Average annual MCF	Average annual change in consumption as % of that in 2000	Average annual change in real \$/MCF	Average annual change in # of HDD
Richest	110	-1.4%	4.5%	-1%
9 <sup>th</sup>	97	-1.7%		
8 <sup>th</sup>	92	-1.2%		
7 <sup>th</sup>	90	-0.2%		
6 <sup>th</sup>	89	-1.0%		
5 <sup>th</sup>	84	-1.1%		
4 <sup>th</sup>	76	-1.1%		
3 <sup>rd</sup>	84	0.4%		
2 <sup>nd</sup>	82	-0.4%		
Poorest	81	-0.9%		
Avg. -1.1%				
Avg. -0.6%				

\* Counts only households using natural gas and paying directly, not through rent.



## Other fuels consumption\* (weighted average of heating oil and propane), 2000-2012

Decile	Average annual gallons	Average annual change in consumption as % of that in 2000	Average annual change in real \$/gallon	Average annual change in # of HDD
Richest	684	-2.3%	7.7%	-1%
9 <sup>th</sup>	582	-1.7%		
8 <sup>th</sup>	560	-2.4%		
7 <sup>th</sup>	549	-1.8%		
6 <sup>th</sup>	534	-1.7%		
5 <sup>th</sup>	545	-2.2%		
4 <sup>th</sup>	520	-2.3%		
3 <sup>rd</sup>	559	-2.1%		
2 <sup>nd</sup>	523	-2.1%		
Poorest	524	-2.8%		
			Avg. -2.0%	
			Avg. -2.3%	

\* Counts only households using heating oil and/or propane and paying directly, not through rent.

## **Increase in (real) average household spending on ALL ENERGY in 2012 relative to 2000**

Income decile	Increase	Average increase
10 <sup>th</sup> (richest)	32.7%	32.9%
9 <sup>th</sup>	37.9%	
8 <sup>th</sup>	24.0%	
7 <sup>th</sup>	24.5%	
6 <sup>th</sup>	45.2%	
5 <sup>th</sup>	21.0%	37.4%
4 <sup>th</sup>	33.3%	
3 <sup>rd</sup>	46.7%	
2 <sup>nd</sup>	44.5%	
1 <sup>st</sup> (poorest)	41.3%	

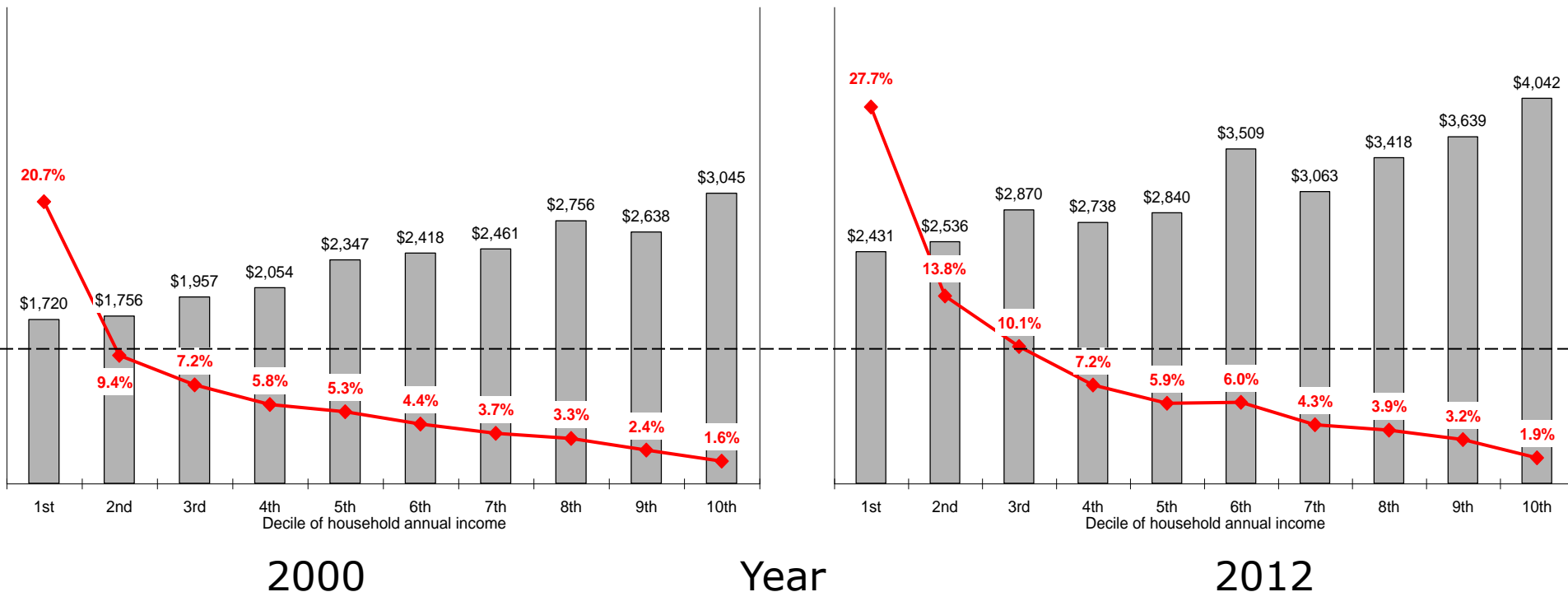
**Why would the lower deciles have larger increases? Lack of access to or utilization of pre-buy prices? Lack of access to or utilization of efficiency improvements?**

## Average annual expenditures for all energy used in the household in Vermont, by decile (2013 USD\$).

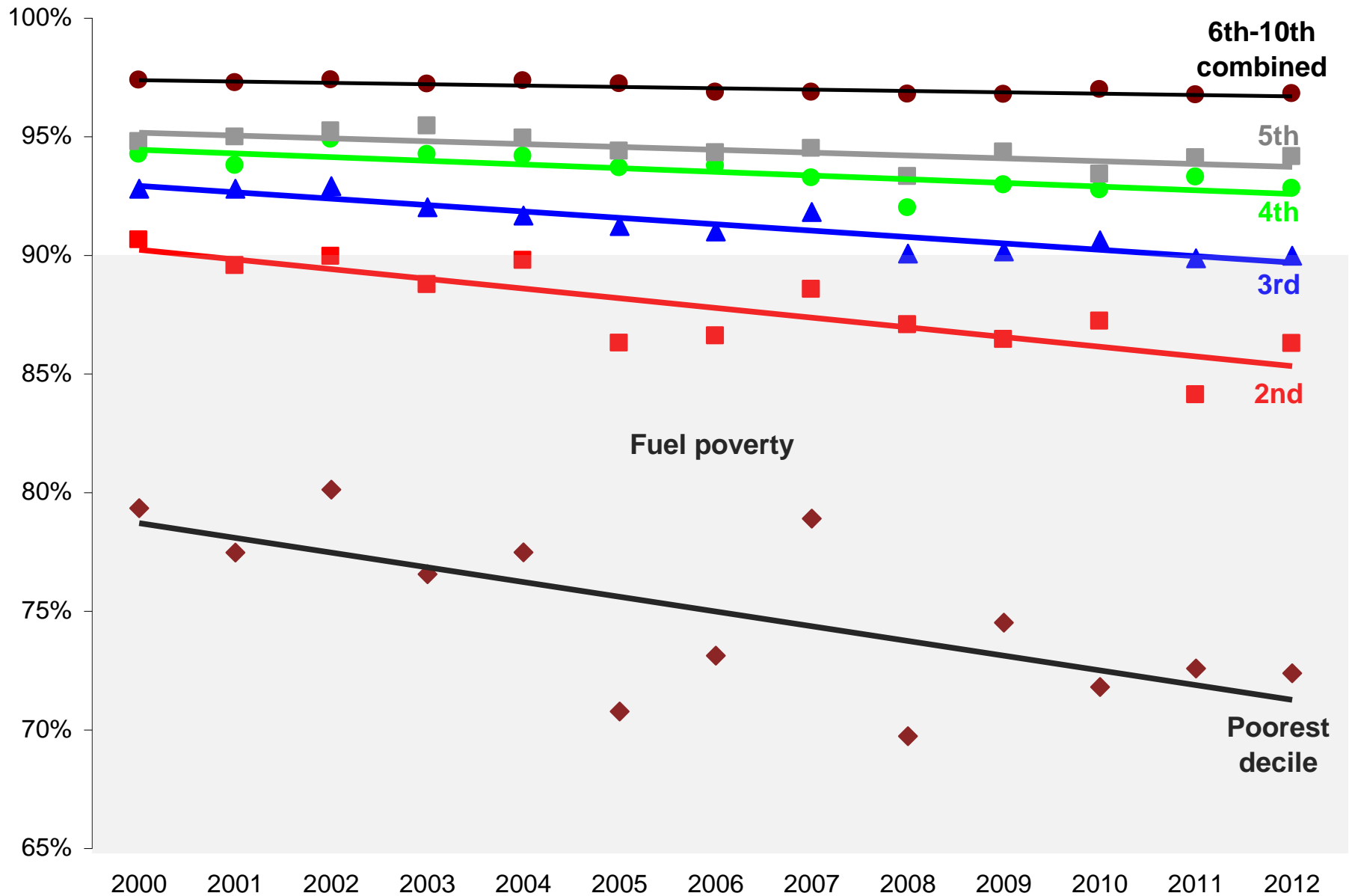
Bars show average spending for households within each decile.

Dots show spending as a percentage of average household income within the decile.

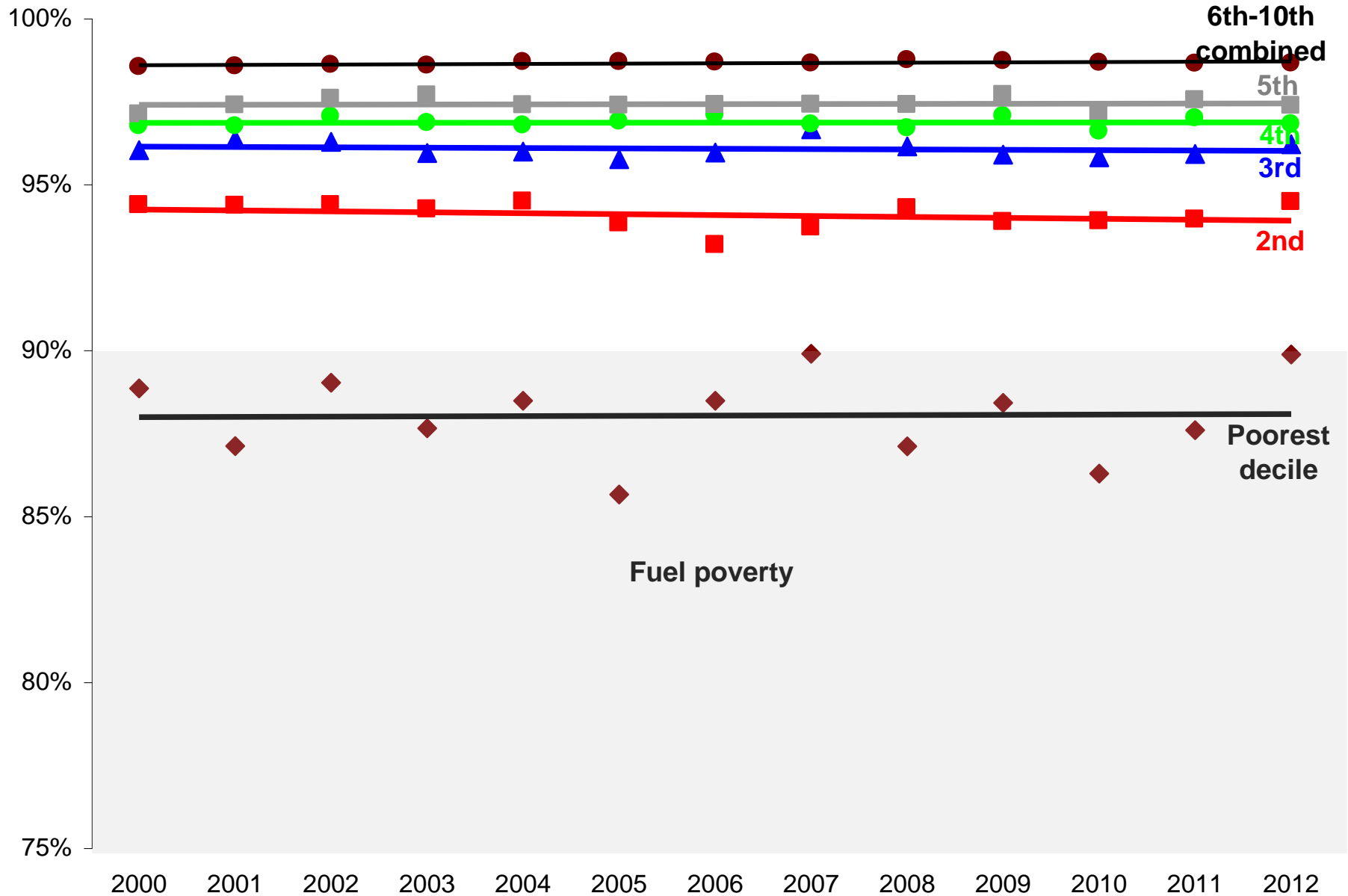
Dashed line is the fuel poverty threshold (over the line = in fuel poverty)



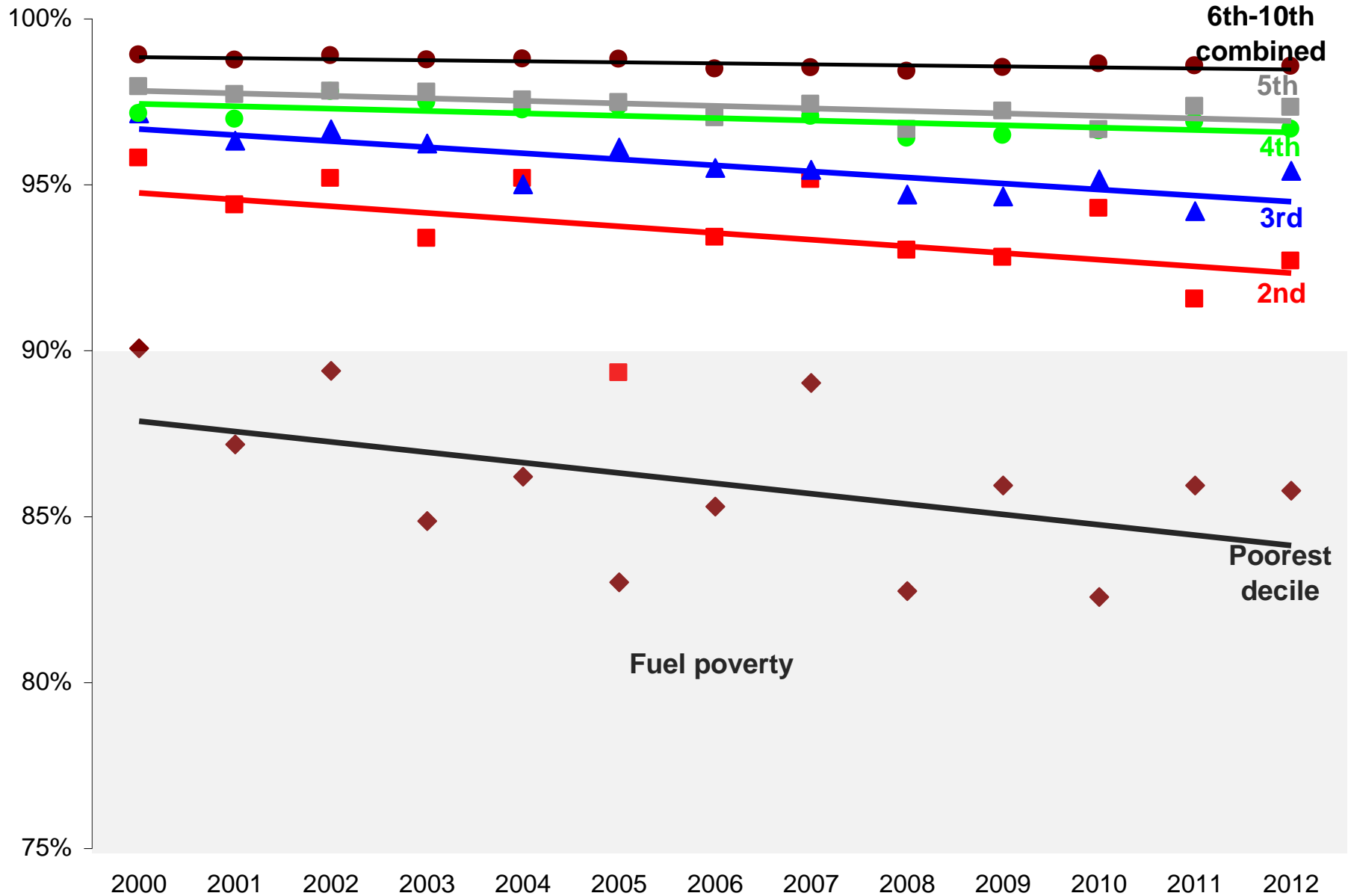
# Average percentage of income remaining after spending on ALL ENERGY, by decile.



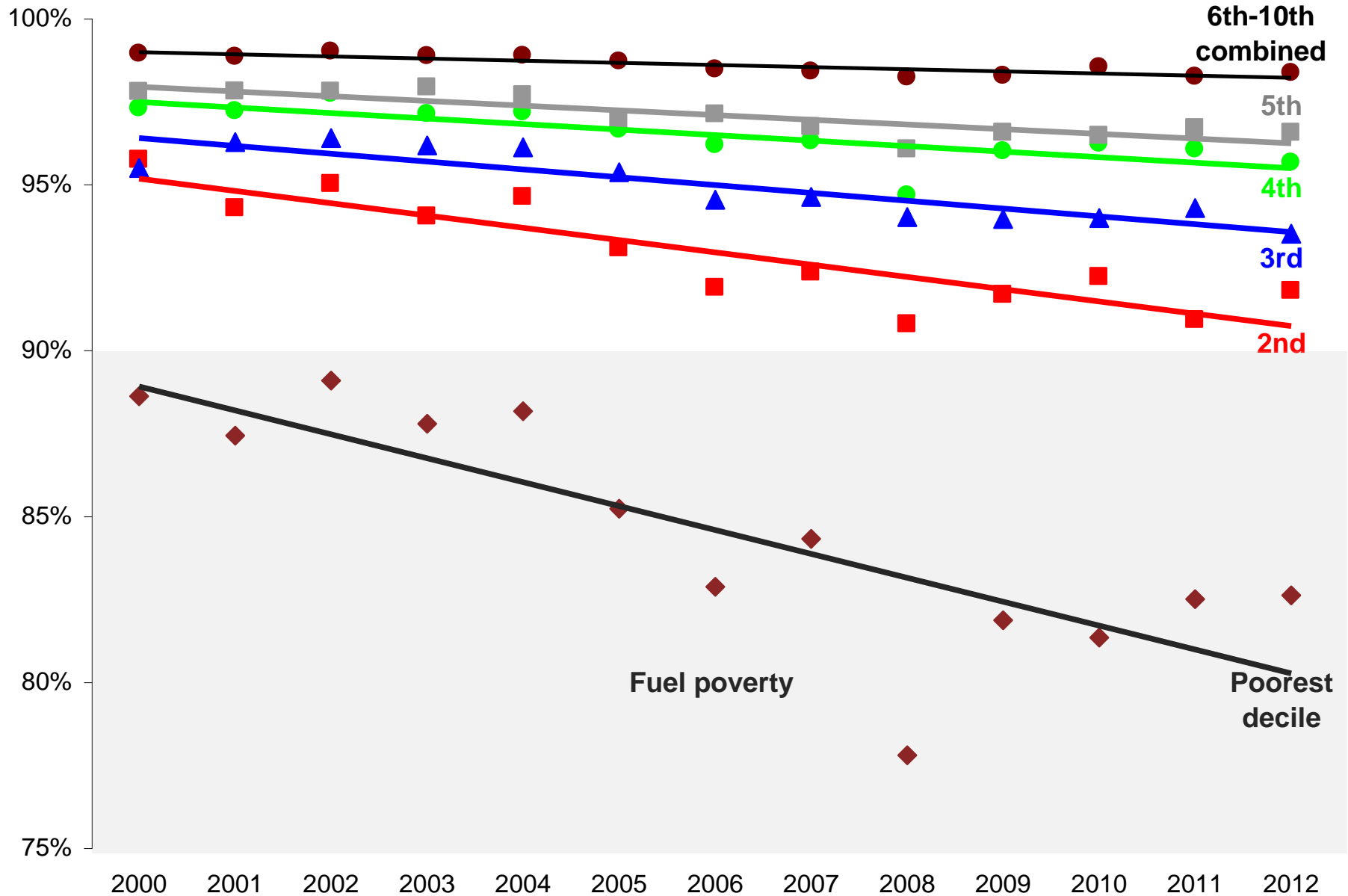
# Average percentage of income remaining after spending on ELECTRICITY, by decile.



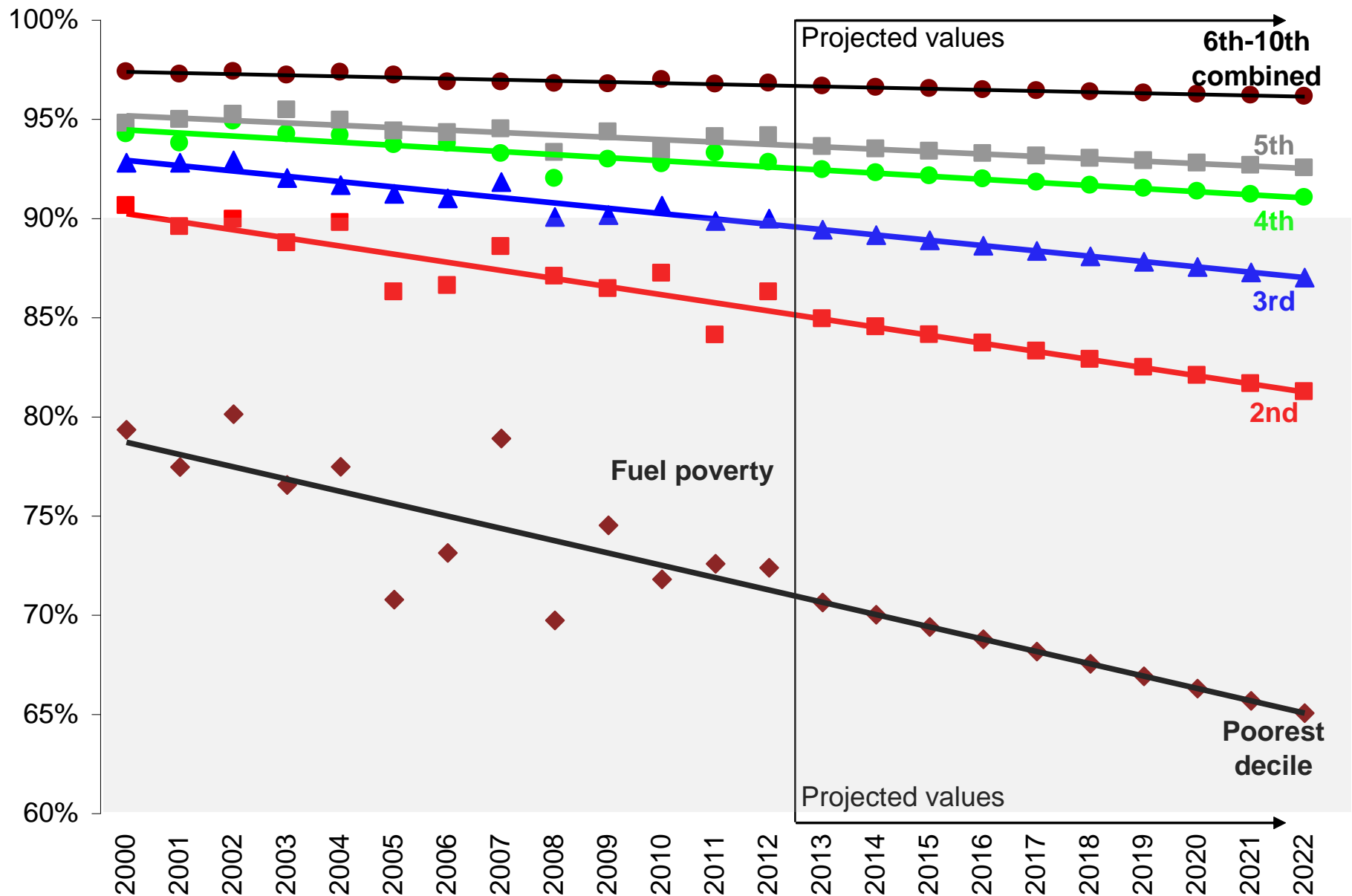
# Average percentage of income remaining after spending on NATURAL GAS, by decile.



# Average percentage of income remaining after spending on OTHER FUELS, by decile.



# Average percentage of income remaining after spending on ALL ENERGY, by decile, with 10-year projection.





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## Future scope of work

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- Compare Vermont to regional consumption and spending on energy by sector (residential, commercial, industrial), 2000-present
  - Electricity
  - Natural gas
  - Heating oil, propane
- Compare decile energy burdens in Vermont to neighboring states (NY, MA, NH) in 2012 (other years if time permits)
- GIS analysis of energy consumption, spending, and burdens throughout Vermont
- Policy recommendations to reduce fuel poverty

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# Thank you.

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# Sources

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- Heating degree day counts from Weather Data Depot, using location "BTV" (Burlington, Vermont), accessed May 8, 2014, from <http://www.weatherdatadepot.com/>.

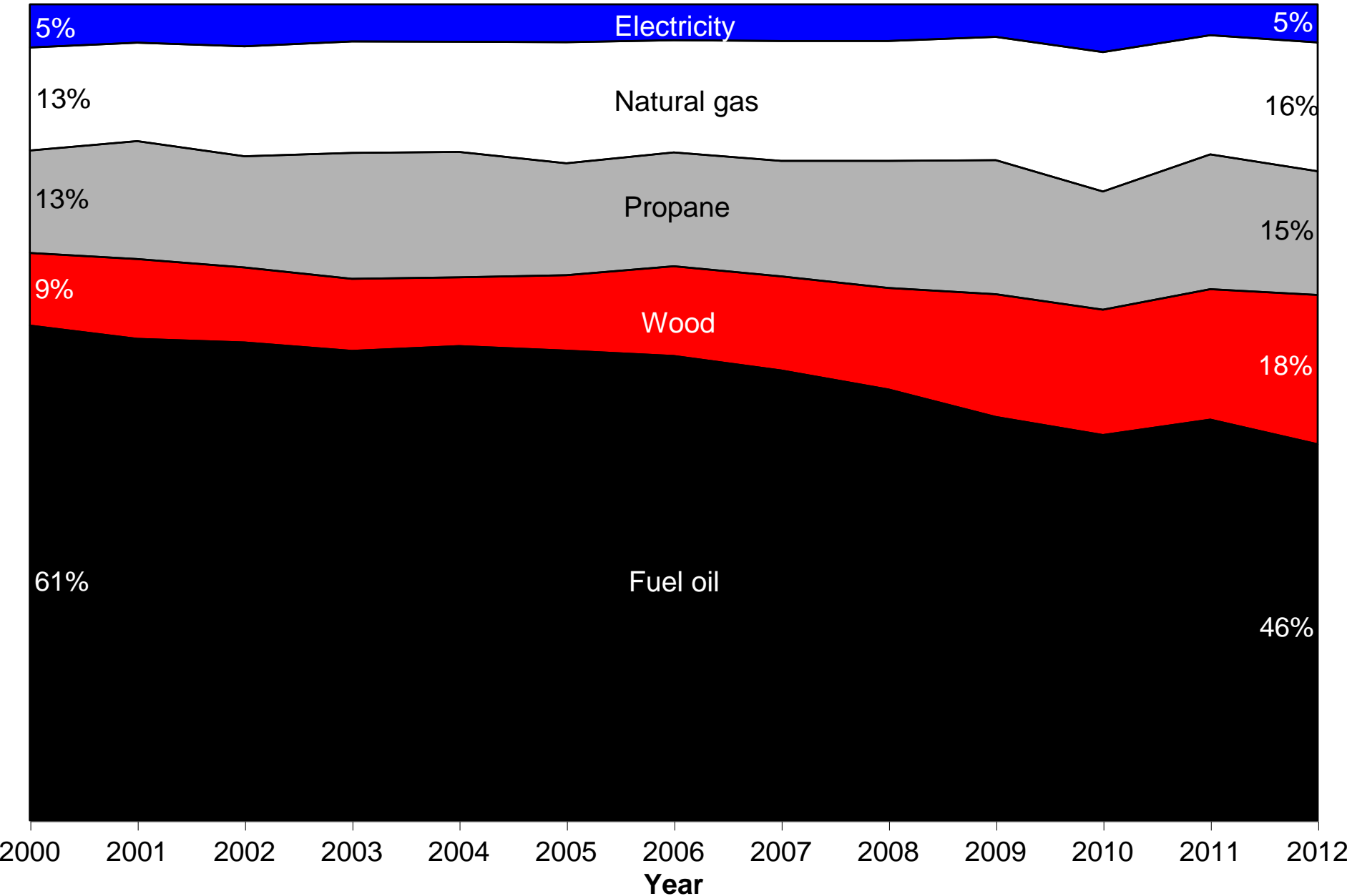
## Household income decile thresholds: to be in decile, household has real (2013 USD\$) annual income...

<b>Decile</b>	<b>In year 2012</b>
10 <sup>th</sup> (richest)	and higher
9 <sup>th</sup>	below \$133,933
8 <sup>th</sup>	below \$98,421
7 <sup>th</sup>	below \$78,757
6 <sup>th</sup>	below \$64,937
5 <sup>th</sup>	below \$53,168
4 <sup>th</sup>	below \$42,980
3 <sup>rd</sup>	below \$33,078
2 <sup>nd</sup>	below \$23,844
1 <sup>st</sup> (poorest)	below \$14,205

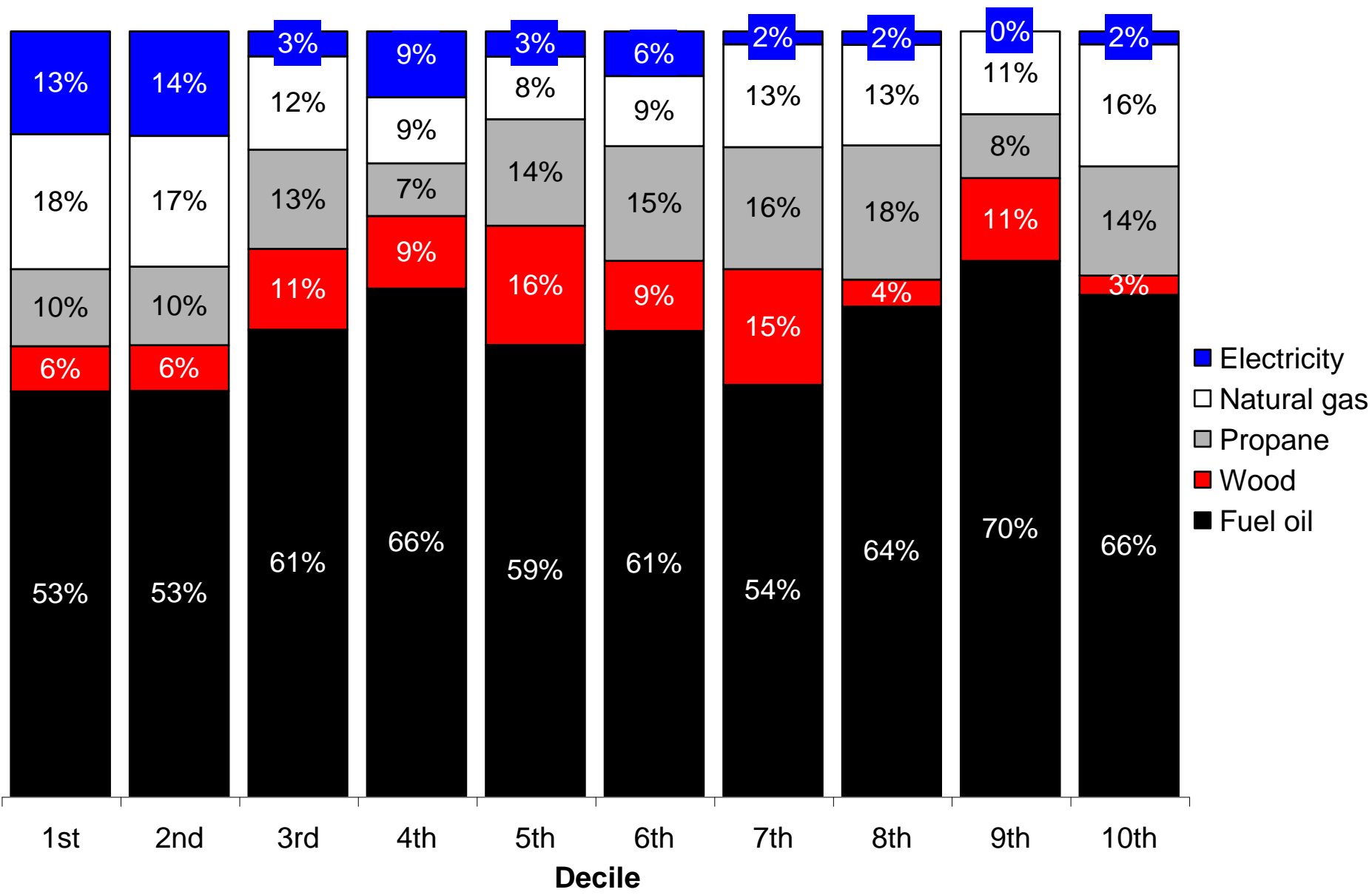
## Percent of renter households in each decile in 2012

<b>Income decile</b>	<b>Renters</b>
10 <sup>th</sup> (richest)	4%
9 <sup>th</sup>	11%
8 <sup>th</sup>	11%
7 <sup>th</sup>	27%
6 <sup>th</sup>	20%
5 <sup>th</sup>	34%
4 <sup>th</sup>	34%
3 <sup>rd</sup>	36%
2 <sup>nd</sup>	48%
1 <sup>st</sup> (poorest)	46%

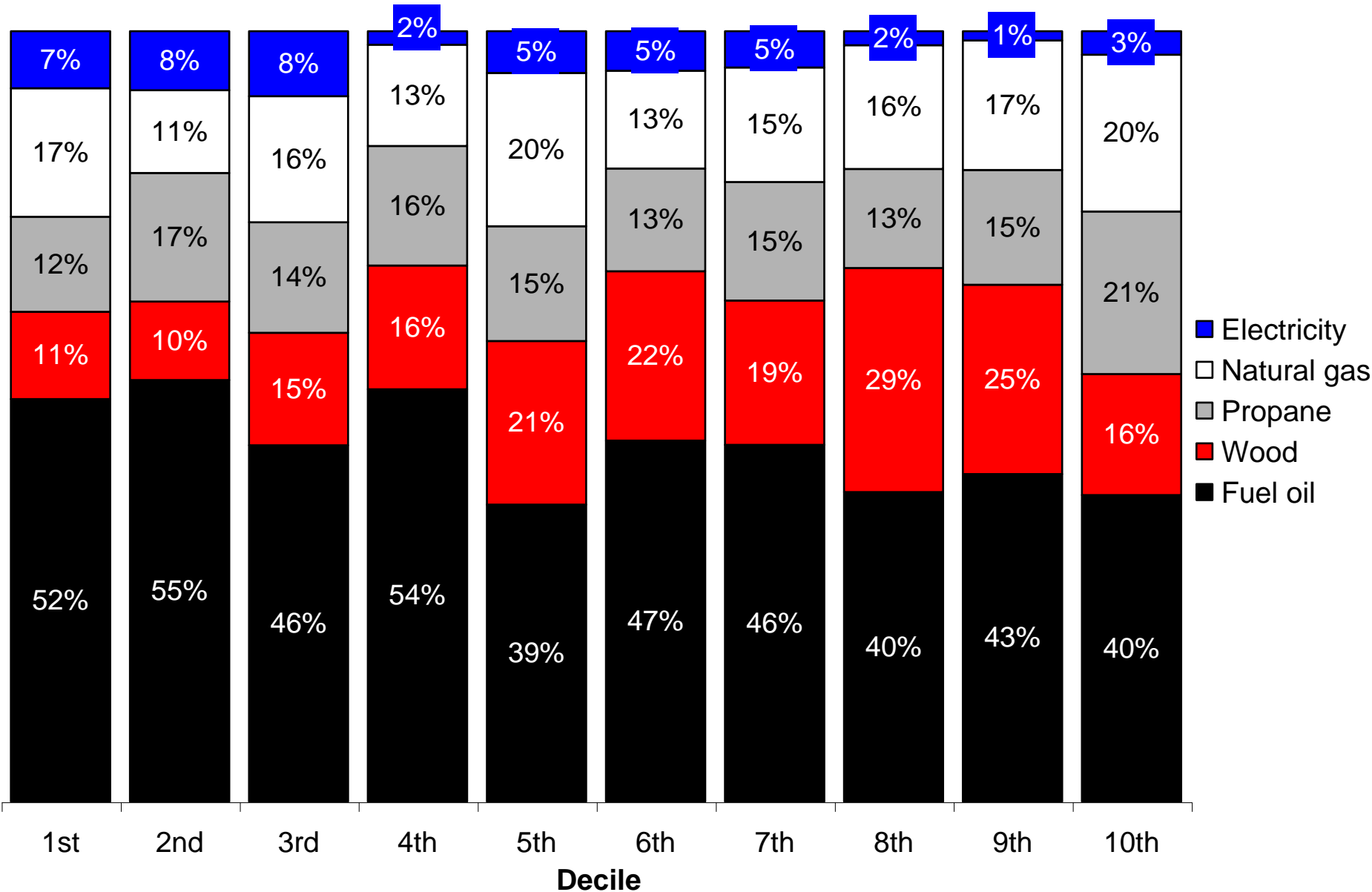
# Percentage of households relying on energy type as *primary* source for heating



# Primary heating fuel in 2000 by decile



# Primary heating fuel in 2012 by decile





# Change in fuel oil and wood as primary heating fuels, 2000-2012, by decile

■ Fuel oil ■ Wood

