

U.S. Metro Economies

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Energy Costs: Impact on U.S. Household Budgets

Prepared for:

The United States
Conference of Mayors
and The Council for
the New American City

Prepared by:



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ENERGY COSTS AND THEIR IMPACT ON U.S. HOUSEHOLD BUDGETS

Prepared for:

**The United States
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ENERGY PRICES AND HOUSEHOLD COSTS

Energy Costs and Their Consequences

Energy costs have risen dramatically over the past several years, and Americans are devoting a larger and larger share of their incomes to heating and cooling their homes and driving their cars. Consumer spending on energy was \$502 billion in 2005, an 18% increase over the previous year. This was the third year in a row that Americans' spending on energy registered a double digit increase. It was also the first year that American consumers' spending on energy surpassed half a trillion dollars.

In the 1990's, consumer spending on energy grew an average of only 2.9% annually. From 2001-2005, by contrast, consumer spending on energy increased an average of 8.4% annually. In 2006, consumer spending on energy will be \$551 billion, a 9.7% increase over 2005. In 2007, we project it will reach \$556 billion.

Energy Expenditures	Avg. Household Energy Costs				Growth Rate	
	2004	2005	2006	2007	1990-99	2001-05
Gasoline & Motor Oil	\$2,065	\$2,481	\$2,765	\$2,663	2.0%	8.4%
Fuel Oil & Coal	\$164	\$194	\$199	\$189	-1.4%	5.3%
Household Natural Gas	\$497	\$580	\$574	\$619	0.0%	8.5%
Electricity	\$1,085	\$1,188	\$1,281	\$1,342	1.6%	4.2%
Total Energy Spending	\$3,812	\$4,443	\$4,819	\$4,813	1.4%	7.0%

Energy Expenditures	Percent of Household Income in 2005
Gasoline & Motor Oil	2.7
Fuel Oil & Coal	0.2
Household Natural Gas	0.6
Electricity	1.3
Total	4.9%

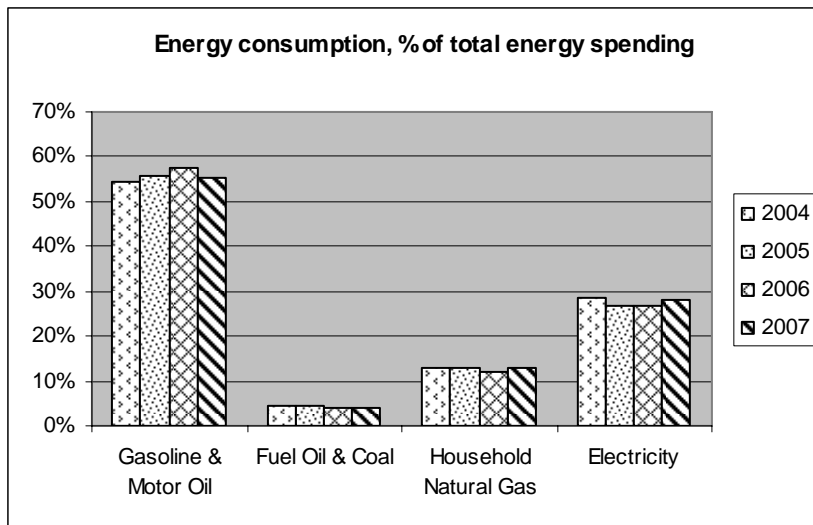
Energy's Impact on U.S. Wages

Energy Costs vs. Wage Gains			
	2005	2006	2007
Average Annual Wage Increase	3.5%	5.1%	3.5%
Average Wage Increase Adjusted for Energy Costs	2.1%	4.7%	3.9%
Percentage point difference	1.4	0.4	-0.4

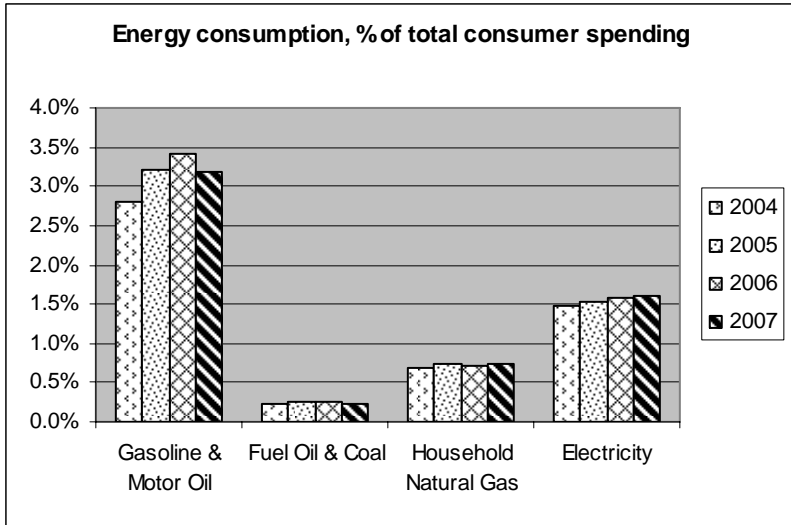
The average wage in 2005 was \$42,444, an increase of 3.5% from 2004. But adjusted for households energy expenditures, the increase in 2005 was only 2.1%, 1.4 percentage points lower than the total wage increase. Energy expenditures for the average household increased an additional \$631 dollars in 2005, the largest increase this decade. In 2006, en-

ergy had a smaller, but still noticeable, impact—shaving .4 percentage points off the 5.1% wage gain. We expect there to be some relief in 2007—albeit very small—relative to the past two years, when energy expenditures will decrease by a mere .1% from 2006 levels to \$4,813 dollars.

Households consume energy in four broad categories: gasoline and oil for transportation, fuel oil and coal for heating the home, household natural gas for heating and cooking, and electricity for other residential needs. Gasoline and motor oil make up the largest chunk of our energy expenditures, accounting for 56% of consumer spending on energy in 2005, with electricity (27%), natural gas (13%), and fuel oil and coal (4%) following. Among the rest of our total consumer spending, money spent on these energy categories accounts for an average of 5.7% of our total expenditures. Gasoline and motor oil accounts for a smaller amount, 3.2%, but a decade earlier, it was only 2.5% of total consumption. Where in their budgets have Americans cut back to compensate for this increase in the cost of gasoline and motor oil? Not in other energy categories.



The share of total consumption represented by fuel oil and coal was the same in 2005 as in 1995. Natural gas's share of total consumption increased 0.1% over the same period. Electricity is the only category to show a decrease—but of only 0.3%. Americans are not cutting back on other forms of energy to make up for the increased cost of gasoline and motor oil; they are instead spending less on other goods and services.



And energy costs have mushroomed this decade. From 1991-1995, the average price of crude oil *decreased* by 5.6% each year. Such a decline is almost unfathomable now; from 2001-2005, the average price of crude oil increased 13.3% annually, and rose 17% in 2006. The retail price of gasoline remained flat from 1991-1995, but escalated an average of 8.4% annually from 2001-2005. Gasoline increased 13% in cost in 2006, influenced by the summer gasoline season. Not surprisingly, higher energy prices have forced Americans to realign their budgets. Energy's share of total consumption was even greater for 2006—5.9%—up from 5.7% in 2005, and 5.2% in 2004, leaving Americans with decreased spending power, despite a growing economy. It was 5.2% a decade earlier, in 1996.

Energy Costs	2004	2005	2006	2007
WTI Crude Oil, \$/barrel	\$41.50	\$56.60	\$66.10	\$64.40
Gasoline, \$/gallon	\$1.90	\$2.30	\$2.60	\$2.50
Natural Gas, \$/million BTU	\$6.10	\$8.70	\$7.20	\$8.50
Residential Electricity, Cents/KWH	9.0¢	9.4¢	9.7¢	10.3¢

“What goes up must come down” is less applicable to gasoline prices in the future. Since spiking to an average \$2.60 per gallon in the third quarter of 2005—largely due to the hurricanes—gasoline prices have not gone below \$2 per gallon. While average gasoline prices declined significantly in the second half of 2006, their level at the pump will remain elevated above \$2 per gallon for the years ahead. Gasoline, unlike most other consumer goods, is not only affected by market supply and demand conditions, but also by crude oil prices that are subject to geo-political shocks created by the OPEC cartel that tends to cut production to support higher prices. And gasoline and crude oil do not always change by the same amount. This asymmetric relationship is such that retail gas prices respond more quickly when crude oil prices are *rising* than when they are falling. While crude oil prices have declined from their summer-2006 peak of above \$75 per barrel towards \$50 per barrel, Global Insight does not expect this to last long. We expect they will stay in the \$60/barrel range

through 2010. This new "low" is significantly higher than even the recent past—in 2000, the price of oil was \$30 a barrel. Thus in 2010, the price of oil will be double that of just a decade earlier. This price escalation is even more dramatic when compared to the price growth of the previous decade; from 1990-2000, the price of oil increased only 14%.

In addition to the price of crude oil, important factors like environmental regulations account for the sustained increase in the price of gasoline. Ethanol blended gasoline is more environmentally savvy than other blend alternatives and is in high demand in cities where there is a higher concentration of pollution. But there are some technological issues that need to be resolved before ethanol can displace gasoline. In the short-term, the introduction of ultra-sulfur diesel to the retail market has caused a fall in prices, but this will not be enough to lower the price to below \$2; we expect the price of gasoline to fall from an average of about \$2.64 in 2006 to about \$2.50 in 2007. Through 2010, gasoline prices will remain in the \$2.50 per gallon range, and consumers will continue to spend over 50% of their energy budgets on transportation fuel. By 2010, Americans will be devoting 55% of their energy budgets or 2.9% of their total spending on gasoline and motor oil, compared to 52% of their energy budgets or 2.6% of their spending on gasoline and motor oil in 2000.

A warm winter decreased natural gas prices, and on average households heating primarily with natural gas are expected to spend about 13% less this winter than the previous one. Total U.S. natural gas consumption in 2006 is expected to fall about 1.2% below the 2005 level and then increase 1% in 2007. The relatively low consumption in 2006 reflects a large drop-off in residential consumption, attributable to the mild weather during the early months of 2006. As a result, there is more natural gas in storage, which should mitigate upward pressure on natural gas prices in the short term. For 2007, however, prices will again rise from an average of \$7.2/million BTU in 2006 to \$8.5/million BTU in 2007 as demand increases again. We expect natural gas prices, like crude oil and gasoline, to stabilize around a new "low" over the next several years; in 2010 natural gas will cost \$8.2/million BTU, nearly twice as much as its average cost, \$4.2/million BTU, in 2000.

Regional Impact of Energy Costs

The impact of U.S. energy costs varies by region. The Northeast, for example, with its cold winters, is much more dependent on home heating oil and coal than the Southwest. Likewise, more densely populated regions spend less money on gasoline and motor oil. Household consumption of energy falls into two categories: home heating/residential needs and transportation. Layered on top of this are each region's geographic characteristics—climate, driving patterns, and region-specific preferences for fuel source. The latter three characteristics determine how consumers are impacted by energy prices.

Consumer Price Increase For Energy in 2006, (% from 2005)			
Region/MSA	Total Energy	Gasoline	Piped Gas & Electricity
Northeast	12.1	14	10.5
New York MSA	10		
Philadelphia MSA	14.9		
Pittsburgh	10.1		
Midwest	9	13.7	4.3
Chicago	3.9		
Detroit	13.5		
Kansas City	8.3		
St. Louis	13.1		
South	11.8	12.3	11.3
Atlanta	7		
Houston	17.7		
Miami	15.5		
West	11.5	12.4	10.4
Anchorage	13.9		
Los Angeles	14.9		
San Francisco	13.5		
Seattle	10.5		
U.S. city average	11.2	12.9	9.4

Energy prices increased 11.2% on average for U.S. cities in 2006, with prices increasing the most in the Northeast region (12.1%). On the other hand, the Midwest region's energy prices increased 9%, the smallest increase of all four regions. One factor contributing to this discrepancy is due to piped gas and electricity prices, which only increased 4.3% in the Midwest on average, less than one-half the national rate of 9.4%.

Electricity costs vary from region to region and from state to state for reasons that include differences in market structures, degree of deregulation, market power, transmission capacity, and level of demand. Fuel cost is also a major contributor to regional differences in wholesale and retail electricity prices. A state's natural resource composition and geographic position is important in determining which fuel source is most cost effective to use. States like Wyoming and Kentucky are rich in coal, while Texas and Louisiana (both part of the West South Central region) each produce almost one-third of U.S. natural gas. Each state also has a unique "portfolio" of energy use by source for electricity generation. Not surprisingly, the West South Central region has the highest share of natural gas in its portfolio,

while the West North Central, East North Central, and Mountain regions, which include large state coal producers such as Wyoming and Illinois, rank the highest for coal shares.

While natural gas is a popular fuel source because of its lower emissions levels, the increase in price over the last few years has raised concerns. The Pacific region, which includes two noncontiguous states, had the highest retail electricity rates in 2005, because neither Alaska nor Hawaii can take advantage of importing electricity from low-price neighbor states. The Northeast region had the second highest retail rates of electricity for both business and residential customers in 2005, and was the second-largest user of natural gas to generate electricity in that same year. The rising price of natural gas is certainly the biggest factor in costs in this region. In 2005, the price of natural gas increased by 41%, and though prices moderated in 2006, we will see the 2006 declines given back in 2007 as the natural gas price rise again by 18%. This price increase effects more than just electricity costs, of course, because natural gas is also used to heat homes.

Focusing again on the three characteristics that determine how a region is impacted by energy prices, we see that the Midwest and Northeast will be hit especially hard, because of their above-average reliance on natural gas to heat their homes and generate electricity, respectively. The seasonal weather patterns in the Northeast and Midwest-cold winters in both regions and hot summers in the Midwest-puts energy in the spotlight much more than other regions of the U.S. On the other hand, the higher prices will benefit producers, of which the West South Central region has a large share.

ENERGY DEMAND IN THE LONG RUN

Our voracious appetite for energy, especially in the form of oil, is once again at the forefront of our long term economic concerns. Last year, the US population passed the 300 million mark. In 25 years it will exceed 365 million, and our economy will more than double in size to a real gross domestic product of \$23 trillion.

Energy conservation and more efficient energy technologies have, especially since the 1973 Middle East oil embargo, lessened our dependence on the growth of new energy supplies. We need not double our energy consumption to achieve a doubling of GDP. Nevertheless, energy demand will grow significantly in the future, as the population increases and energy-dependent appliances like computers continue to be ever more integrated into homes and businesses. Consider, too, the amount of new and renovated building construction that must occur to support this economic growth, which is so vital to maintaining and increasing the living standards of over 300 million Americans.

Global Insight projects that, by 2031, 39.3 million new homes will be constructed, and that commercial building construction will total 20 billion square feet. At the current average usage of energy for heating, cooling, and electricity, this new construction will generate an additional demand of 4 quadrillion BTU of energy annually. That energy is equivalent to 700 million barrels of oil, or 4 billion cubic feet of natural gas. The supply from a combination of those sources would result in a \$40 billion annual cost by 2031. Total expenditures over the next 25 years for the energy needs of these new buildings will equal \$500 billion.

Because the building sector (residential and commercial) accounts for 40% of total annual U.S. energy consumption—more than any other sector including transportation—the potential impact of a move to reduce our reliance on high cost oil and gas supplies, largely from overseas, would be dramatic. A 10% reduction in energy demand for these new buildings would generate \$50 billion in savings over the next 25 years.

CONCLUSION

We have in this report evaluated the stress placed on household budgets by energy costs. At the same time, Americans are devoting a larger and larger share of their incomes for energy expenditures. The cost of electricity for household operation, for heating and cooling homes, and for transportation took up 5.9% of household income last year (2006), up from 5.1% a decade ago. That 5.9% translated to an average cost of \$4,819 dollars per household in 2006. Moreover, though energy prices have fallen since their peaks in the spring of last year, the long term forecast offers little respite. In 2010, energy prices will have risen 30% from 2004 levels.

These trends come at an unfortunate time for American families, because not until 2005 did real median household income finally see its first increase of the decade. And those gains continued to be skewed towards the highest income earners, while the median income remains below that of 1999.

Over the long term, higher energy costs will make energy conservation such as "green" building, and new technologies such as hybrid cars that reduce the demand for foreign oil, a crucial determinant of American prosperity. As mentioned earlier, total expenditures over the next 25 years for the energy needs of the 40 million homes and 20 billion square feet of office space that will be added in the US will equal \$500 billion. The potential impact of a move to reduce our reliance on high cost oil and gas supplies would be dramatic, and increasingly, looks to be necessary.

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