Winter Fuels Outlook 2010-2011

-name redacted-
Specialist in Energy Economics

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Summary

The Energy Information Administration (EIA) in its *Short-Term Energy and Winter Fuels Outlook* (STEWFO) for the 2010-2011 winter heating season projects that American consumers should expect to see heating expenditures rise by 2.5% on average compared to last winter. Average expenditures for those heating with natural gas are projected to see an increase of 3.6%, while those heating with electricity are projected to see a decline in expenditures of 1.9%. These two fuels account for the heating for approximately 88% of all U.S. households. Propane and home heating oil consumers are projected to see cost increases of 7.5% and 11.5%, respectively.

Within the U.S. average projections, differences exist with respect to region of the country and type of fuel.

Economic conditions of slow growth and high unemployment suggest that lower consumption of all fuels is likely, especially in the context of milder winter weather conditions that have been forecast by the National Oceanic and Atmospheric Administration (NOAA). The price of oil has been increasing in the months leading up to the 2010-2011 winter heating season. If the price of oil continues to increase beyond the projected level of $85 per barrel, heating costs might be expected to rise above projected levels for all consumers.

Uncertainty exists with respect to the status of funding for the Low Income Energy Assistance Program (LIHEAP), the key federal program assisting low-income households with heating expenditures. Funding levels for the program have not been determined because Congress has not passed the FY2011 appropriations for the Departments of Labor, Health and Human Services, and Education (S. 3686). A continuing resolution is currently funding the program at the FY2010 level (H.R. 3081, P.L. 111-242).

It has not been announced whether the CITGO/PDVSA program that assists some U.S. heating oil consumers will be continued.

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Introduction

Each year, in October, the Energy Information Administration (EIA) publishes the *Short-Term Energy and Winter Fuels Outlook* (STEWFO).[1] The purpose of the STEWFO is to provide estimates of expected average annual heating fuel expenditures in comparison to the previous year. While the STEWFO provides estimates of average annual expenses, individual expenses may vary regionally, as well as being dependant on local weather conditions, market size, the energy efficiency characteristics and size of homes, and thermostat settings.

Average annual heating fuels expenditures depend on the price of fuel used, with natural gas, heating oil, propane, and electricity constituting the main heating fuels in the United States. Expenditures also depend on the quantity of fuel used, which is based on individual consumer decisions. Weather conditions, measured by heating degree-days, are the other key factor in determining expenditure levels.[2] The National Oceanic and Atmospheric Administration (NOAA) provides heating degree-day estimates to the EIA for the STEWFO.

The STEWFO is not a forecast in the statistical sense, but a projection based on assumed values of key prices. If the underlying price estimates prove to be incorrect, or the weather varies from forecast trends, actual average heating expenditures will reflect the changes.

Average Annual Heating Fuels Expenditures

NOAA forecasts a 2.8% reduction in heating degree-days for the 2010-2011 heating season compared to the 2009-2010 heating season for the United States as a whole. Regional differences in weather, along with regional fuel specialization, can change the regional expenditure projections from the U.S. average.

In the Northeast, heating degree-days are expected to increase by 5.5%, while in the West they are expected to increase by 0.4%. Estimated heating degree-days are expected to decline 14.9% in the South, and decline by 0.7% in the Midwest.[3]

On average the household expenditure on heating fuels is projected to be $986 this winter, an increase of $24, or 2.5%, from last winter. The average expenditure increase reflects generally higher fuel prices in all categories and the partially offsetting quantity effects of generally milder weather. **Table 1** provides a summary of the percentage changes in the key components of average annual heating fuel expenditures by fuel.

[1] The winter heating season runs from October 1 through March 31.

[2] Heating degree-days are defined as the day's average temperature, calculated as the high plus low temperatures divided by two. If the number is less than 65, subtract the average temperature from 65. The result is the number of heating degree-days.

[3] All percentage changes in the STEWFO and this report are calculated on a yearly heating season basis. The estimated 2010-2011 values are compared to 2009-2010 levels.

Table 1. U.S. Average Winter Fuels Projections, Winter 2010-2011

(percentage change)

	Natural Gas	Heating Oil	Propane	Electricity
Consumption	-2.0	3.2	-3.2	-3.7
Price	5.7	8.0	11.0	1.9
Number of Households	1.2	-2.9	-3.1	2.9
Expenditure	3.6	11.5	7.5	-1.9

Source: Energy Information Administration, *Short-Term Energy and Winter Fuels Outlook*, Table WFO1, October 2010.

Notes: Percentage change compares projected changes for the 2010-2011 heating season compared to 2009-2010.

Regionally, the EIA expects expenditures on natural gas to increase the most in the Northeast, at 11.6%, and to increase by 5.6% in the Midwest. Expenditures on natural gas are expected to decline by 3.1% in the West and by 2.5% in the South. Expenditures on heating oil are expected to increase by 13.3% in the Northeast, 9.7% in the Midwest, and 8.7% in the West, while declining by 3.5% in the South. Expenditures on propane are expected to increase by 14.1% in the Midwest, 13.8% in the Northeast, and 10.3% in the West, while declining by 5.6% in the South. Expenditures on electricity are expected to increase by 4.7% in the Northeast and 0.4% in the Midwest, while declining by 3.9% in the South and 0.4% in the West.

Due to changing conditions in the fuel markets the prices assumed in the STEWFO can differ from those observed. For example, the STEWFO calculations are based on a heating oil price of $3.06 per gallon, while the actual price of heating oil in August 2010 was $2.62 per gallon, almost 15% less. Unless heating oil prices rise during the course of the winter fuel season to average $3.06 per gallon, the STEWFO will overstate expenditures by heating oil consumers. The same type of effect is likely to be observed if the weather is colder, or warmer than forecast by NOAA, or if consumers change their consumption habits at any given price, or in response to any given number of heating degree-days.

Natural Gas

The U.S. natural gas market is part of a North American regional market. The United States draws about 83.5% of its natural gas supplies from domestic sources, about 14% imported by pipeline, largely from Canada, and 2% largely from Trinidad, delivered in the form of liquefied natural gas.

Consumers of natural gas include households and commercial customers that largely use natural gas for space heating. Electric power generators, especially those that satisfy peak demand loads, use natural gas as a raw material to power generators. Industrial consumers use natural gas as a raw material, for example in fertilizer production, and as a heat source in industrial processes. Household, commercial, and electric power generators are those consumers whose consumption is most likely to be affected by winter conditions.

Table 2 presents average household natural gas consumption and price data for the winter heating seasons 2006-2007 through projected values for winter 2010-2011.

Table 2. Average Household Winter Natural Gas Consumption and Prices

(thousand cubic feet, mcf)

	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
Consumption	65.3	66.8	68.8	69.2	67.9
Price ($/mcf)	12.35	12.71	12.89	10.84	11.46

Source: Energy Information Administration, *Short-Term Energy and Winter Fuels Outlook*, Table WFO1, October 2010.

Notes: Data for Winter 2010-2011 are projected.

On a per household basis, as presented in **Table 2**, winter consumption of natural gas has been relatively stable, with an observed variation of about 5% between the highest and lowest values over the five-year period. Similarly, consumer prices have been relatively stable, but falling in 2009-2010, and increasing somewhat in the projection for 2010-2011. The price-consumption relationship suggests that natural gas demand is price inelastic for households, implying that consumption might not be expected to respond sharply to changes in price.[4] An inelastic relationship is likely because home heating is typically considered a necessity by consumers. In addition, existing metering technology does not provide consumers easy access to quantity consumed and cost data. Income levels, along with the weather, may also be important in determining natural gas consumption. Approximately 52% of all U.S. households heat with natural gas.

On a national level, over all consumer groups, total natural gas consumption fell by about 2% from 2008 to 2009. Only the electric power generating sector experienced rising consumption, an increase of about 3.3%. Residential, commercial, and industrial demands all declined from 2008 to 2009. The STEWFO projects an increase in total natural gas consumption of 4.6% from 2009 to 2010, and a further 0.1% increase in consumption for 2011. Most of the increased consumption is expected to occur in the industrial and electric power generation sectors.

The STEWFO projects an increase in U.S. natural gas production of about 3.5% in 2010, to be followed by a decrease in production of 1.5% in 2011. The relative weakness of natural gas prices in 2010, reflecting the additions to reserves in the form of shale and other non-conventional sources, has spurred production. However, these lower prices, and the growing price spread between petroleum liquids and natural gas, have shifted exploration and drilling activity in the direction of liquid-rich deposits.

Imports of natural gas are expected to increase by about 1.5% from 2010 to 2011, mostly on pipeline imports from Canada. Lower natural gas prices in North America than in Asia and Europe will continue to make liquefied natural gas a small component of the U.S. gas picture.

Natural gas demand from households and commercial customers peaks in the winter, and to a lesser extent in the summer. This leads to accumulation of natural gas in storage facilities in the off-peak seasons. At the beginning of the winter heating season, October 1, natural gas in storage was approximately 3.5 trillion cubic feet, about 5% above the five-year average storage amount.

[4] Price elasticity of demand is percentage change in quantity demand divided by percentage change in price. Demand is considered to be inelastic if the price elasticity computation yields a value less than one.

Heating Oil

Home heating oil is a middle distillate, derived from the same part of the refining process as diesel fuel. As a result, the price of home heating oil is closely related to the price of oil as well as the price of diesel fuel. Approximately 7% of U.S. households heat with oil, and most of these consumers are in the Northeast, where 80% of U.S. heating oil consumption occurs.

Table 3. Average Household Heating Oil Consumption and Price

(gallons, price per gallon)

	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
Consumption	653.9	662.3	709.0	673.3	695.0
Price	2.49	3.32	2.63	2.83	3.06

Source: Energy Information Administration, *Short-Term Energy and Winter Fuels Outlook*, Table WFO1, October 2010.

Notes: Data for 2010-2011 are projected.

EIA expects average heating oil expenditures per household to increase by $218, or 11.5%. Projected expenditure increases in the Northeast are 13.3%, in the Midwest 9.7%, and in the West 8.7%, while the South expects a decline of 3.5%.

Diesel fuel, a product almost identical to home heating oil, has been more expensive than gasoline in 2010, averaging about $0.20 per gallon higher. About the same premium of home heating oil prices over the price of gasoline has been observed. These price differentials result from U.S. refiners' emphasis on gasoline production and a relatively high level of world demand for diesel fuel. The costs of gasoline, diesel fuel, and heating oil are all directly related to the price of crude oil on the world market. The EIA projects the price of crude oil to rise to $85 per barrel during the 2010-2011 heating season. The spot price of West Texas Intermediate, a reference crude oil, averaged over $80 per barrel in the first half of October 2010.

The key risk factor for home heating oil consumers is the price of crude oil. Oil prices can be volatile. The economic recession, beginning in December 2007, and accompanied by record high crude oil prices in 2008, served to decrease demand. Overall liquid fuels consumption in the United States is projected by the EIA to increase by 1.1% in 2010 and 0.6% in 2011. Within these overall increases, gasoline consumption is expected to increase by 0.2% in 2010, while distillate consumption is expected to increase by 2.7%. The larger relative increase in distillate consumption is likely to maintain or increase the price premium of these fuels over gasoline, and create upside price risk over the STEWFO projection.

Propane

Propane provides primary home heating for approximately 5.6 million households in the United States, about 6% of total households. Propane consumers are projected to experience a $136, or 8%, increase in heating expenses during the winter 2010-2011 season. The number of households heating with propane has declined every year for the past five years, suggesting that propane is not a preferred fuel. EIA expects a decline of 3.1% in households using propane for 2010-2011 compared to 2009-2010.

Table 4. Average Household Propane Consumption and Price

(gallons, price per gallon)

	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
Consumption	775	794	821	841	814
Price	2.01	2.45	2.38	2.18	2.42

Source: Energy Information Administration, *Short-Term Energy and Winter Fuels Outlook*, Table WFO1, October 2010.

Notes: Data for 2010-2011 are projected.

The EIA sees propane expenditures rising by 14.1% in the Midwest, 13.8% in the Northeast, and 10.3% in the West. Only in the South is a decline in propane expenditures expected, at 5.6%. The reduced consumption of propane in the South is due to milder expected weather in that region that more than offsets the expected increased cost per gallon.

Propane is unique compared to the other fuels covered in this report in the sense that it is a by-product and not directly produced in its own right. The production of gasoline and natural gas both give rise to propane supply. As a result, when the availability of those fuels is high, so is the supply of propane.

Complicating the propane outlook for the Northeast is a leak that was found in the TEPCO propane pipeline in New York. Several terminals have been closed, and may be closed for part of the winter heating season. The pipeline leak also threatens supplies of propane to New England, because even though the region is primarily supplied through imports, an early season cold weather episode could threaten the ability to draw additional supplies from the pipeline.

Many of the same factors that affect natural gas and home heating oil prices influence expected propane prices. However, in the propane case, the relationship is indirect because of the by-product nature of propane. Propane prices, unlike the other fuels covered in this report, are affected by distance and dispersion of the consumers. This is because the distribution process usually requires the delivery, by truck, of relatively small quantities to individual consumers.

Electricity

Electricity prices are related to natural gas and coal prices as well as the availability of nuclear power and various alternative fuels.[5] In addition to electricity being generated by using natural gas, natural gas is also a competitor to electricity as a home heating source. Approximately 37% of U.S. households use electricity as their primary heating source. In the Northeast electricity use is lowest, at 13%, while it is highest in the South at 61%. Overall growth in the number of households using electricity is 2.9% year on year, driven by further expansion of market share in the South. In comparison, the number of propane and heating oil customers is declining, by an expected 3.1% and 2.9%, respectively. Natural gas is the heating source used by an expanding number of customers, at an expected expansion of 1.2% in 2011.

[5] In 2009 coal fueled about 45% of U.S. electricity generation, natural gas about 24%, nuclear about 20%, hydro about 7%, and all other fuels including renewable fuels about 4%.

Table 5. Average Household Electricity Consumption and Price

(kilowatt hours and dollars per kilowatt hour)

	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
Consumption	8,216	8,251	8,438	8,687	8,035
Price	0.101	0.104	0.112	0.110	0.112

Source: Energy Information Administration, *Short-Term Energy and Winter Fuels Outlook*, Table WF01, October 2010.

Notes: Data for 2010-2011 are projected.

The EIA projects relatively low heating expenditure increases for those heating with electricity. In the Northeast a 4.1% increase is expected, while the South is projected to see a decline in expenditures of 3.9% and the West is projected to see a decline of 0.4%, while the Midwest will see a projected increase of 0.4%. Electricity prices have been relatively stable across the regions, with little price volatility.

Risk Factors

The primary risk factors concerning the STEWFO are the weather and economic conditions. Total household expenditures on home heating are equal to the price of the fuel times the quantity of the fuel used. The weather, measured by the number of heating degree days, largely determines the quantity of fuel used. Conservation, in the form of reduced temperatures inside the home, can also reduce the quantity of fuel consumed, but for a given desired temperature inside the home, heating degree days are the key factor. The 2010-2011 winter heating season is expected to be colder than last winter in the Northeast, and warmer in the South, with the Midwest and the West within 1% of last year.

The other component of total heating expenditures, the price of fuel, is determined by a complex web of related prices and other economic variables. In a period of weak macroeconomic conditions, including high unemployment, the key relationship may be that between the level of economic activity, measured by the growth rate of gross domestic product and the price of crude oil. At the beginning of the 2010-2011 heating season the price of crude oil is above $80 per barrel.

A higher price for crude oil directly increases the price of home heating oil and propane. Natural gas supplies are reduced as a larger spread develops between oil and gas. Electricity prices are directly affected by natural gas and coal prices. Natural gas prices are expected to increase by 5.7% during the 2010-2011 heating season.

Heating Expenditure Assistance

The Low Income Energy Assistance Program (LIHEAP) is the primary federal government program to supplement home heating expenditures.[6] LIHEAP is composed of two parts: funding

[6] See CRS Report RL31865, *The Low Income Home Energy Assistance Program (LIHEAP): Program and Funding*, by (name redacted), for more detail on the program.

for block grants to states and emergency contingency funds. For FY2011, the Administration has proposed $2.51 billion for LIHEAP regular funds and $790 million for emergency contingency funds. In contrast, for FY2010 and FY2009 the totals were $4.5 billion in regular LIHEAP regular funds and $590 million in emergency contingency funds (P.L. 111-117 for FY2010).

The Administration's FY2011 plan also includes trigger mechanisms which would increase LIHEAP funds when energy prices or participation in the Supplemental Nutrition Assistance Program (formerly the Food Stamp Program) reaches pre-set levels. At the start of the winter heating season 2010-2011, the Senate Appropriations Committee has reported its version of the Departments of Labor, Health and Human Services, and Education (LHE) appropriations bill (S. 3686), which provides $3.3 billion for LIHEAP. For FY2011 the House LHE subcommittee provides $5.1 billion for LIHEAP. A continuing resolution is currently funding the program at the FY2010 level (H.R. 3081, P.L. 111-242).

CITGO, the United States subsidiary of the Venezuelan national oil company PDVSA, has its own Low Cost Heating Oil Program, which operates without any connection to the U.S. government.[7] The program, operated in conjunction with a non-profit, the Citizens Energy Corporation, began in 2005. During the 2009-2010 heating season, 25 states and the District of Columbia participated in the program, which discounts the delivered cost of home heating oil by about 40%. CITGO estimates that 157,000 households, 245 homeless shelters, and 250 Native American communities benefited from the program in 2009-2010. CITGO has not announced whether the program will continue in the current year.

Conclusion

The STEWFO projects that Americans will generally face increased heating costs during the winter of 2010-2011. Fuel prices are generally expected to be higher, which more than offsets lower expected consumption due to milder weather, and yields costs that are projected to rise by about 2.5% for what most consumers consider a necessity. The impact of the cost increases may be accentuated by continuing high levels of unemployment.

Uncertainty as to the funding levels for LIHEAP, and concern as to whether the CITGO program will continue in 2010-2011, contribute to the burden of higher heating costs.

Author Contact Information

(name redacted)
Specialist in Energy Economics
/redacted/@crs.loc.gov, 7-....

[7] For more details, see http://www.citgoheatingoil.com.