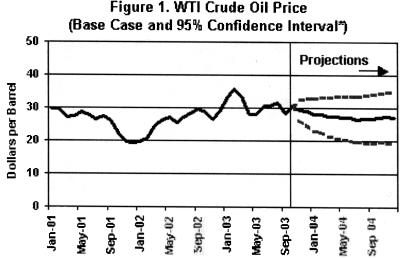
Short-Term Energy Outlook – November 2003

November 6, 2003 Release (Next Update: December 8, 2003)



Overview

World Oil Markets. While West Texas Intermediate crude prices have remained slightly below our previous baseline projection for October, current prices are close to \$29 per barrel, with prices for the 5 trading days ending November

"The confidence intervals show */- 2 standard errors based on the properties of the model. The ranges do not include the effects of major supply, disruptions.

Sources: History EIA; Projections Short Term Energy Outlook, November 2003.

averaging \$29.20 per barrel (Figure 1). Our projected gradual decline toward \$27 per barrel reflects a slow but steady return toward more normal levels of petroleum stocks in industrialized countries compared to previous months. It is assumed in this *Outlook* that overall OPEC oil production (including natural gas liquids) in 2004 will decline from the 2003 average by about 0.7 million barrels per day as the effect of quota reductions offset increased output from Iraq. Two other factors will also impact world oil markets: Russia may not limit its oil production and overall non-OPEC production is likely to rise by some 1.3 million barrels per day in 2004 from 2003.

Degree-Day Forecasts. Starting with this issue of the *Outlook*, degree-day projections by Census Division from the National Oceanographic and Atmospheric Administration (NOAA) Climate Prediction Center (CPC) will be used in the *Short-Term Energy Outlook* (*Outlook*) in place of the history-based "normal" values previously used. While degree-day outlooks are subject to considerable uncertainty at both the national and regional level, EIA feels that the CPC projections contain information than can help to improve the quality of EIA's baseline energy projections. The CPC projection used in this month's *Outlook* is roughly 1.4 percent colder than the previously-used norm in 2004.

Winter Fuels Update. A warm start to the heating season has kept early heating demand levels at a minimum in the United States, contributing to continued builds in underground natural gas storage to above-average levels. Heating degree-days were approximately 11 percent below normal in October (on a

Schedule JAB-4 Page 1 of 12 population-weighted basis) and the first week in November brought unseasonably warm weather to key heating areas in the Midwest and Northeast. Consequently, working gas in storage is projected to reach nearly 3,200 billion cubic feet at the end of the injection season and the natural gas spot price at the Henry Hub dipped below \$4.00 per million Btu (mmBtu) on October 31 for the first time in 2003. However, mid-winter futures for natural gas remain near \$5.00 per mmBtu, and at \$28-\$30 per barrel, West Texas Intermediate crude oil prices, while weaker than previously projected, remain above the average of \$26.90 per barrel seen during the fourth quarter over the last 3 years. Continued aboveaverage temperatures would yield new downward pressure on heating fuel prices during the fourth quarter, but consumer prices for fuels still seem poised to exceed year-ago levels during the October to December period. Given NOAA's degree-day forecasts, the outlook for household heating bills remains mixed relative to 2002-2003: natural gas-heated homes: up 6 percent; heating oil users: down 6 percent; propane-heated households: about flat; and homes with electric heat: up about 4 percent.

Details

Figure 2. OECD Commercial Oil Stocks 3.00 2.90 2.80 2.70 2.60 2.50 2.40 2.30 Previous 5-year End-of-month 2.20 Projection min/max range _Inventories 2.10 2.00 Sep-03 Sources: History EIA; Projections Short Term Energy Outlook, November 2003.

World Oil Markets.

Crude Oil Prices. monthly Average prices for the major marker crude oils rose by \$2-\$3 per barrel in October, offsetting declines of a similar amount in September. **Prices** for these marker crude oils were \$1-\$2 higher per barrel than year-ago 2002) (October (Figure 1). The OPEC basket price

continued to be within or above its target range for the nineteenth consecutive month and has not fallen below this range since March 2002. However, oil prices softened towards the end of the month. EIA projects that the industrialized countries' oil inventories, which were about even with year-ago levels at the end of October, will show noticeable year-over-year increases compared to the extraordinarily low levels seen at the end of 2002.

However, OECD commercial inventories are tight relative to normal levels for this time of year and are expected to remain so until the middle of 2004 (Figure 2). Until these inventories are rebuilt to well above observed 5-year lows, WTI crude oil prices should remain firm, then gradually slide to roughly \$27 per barrel as Iraqi oil exports in 2004 begin returning to near pre-war levels.

OPEC Oil Supply. In October, OPEC 10 oil production (excluding Iraq) was stable at an estimated 25.5 million barrels per day, about the same as their estimated September production level and only slightly above the OPEC 10 production targets that took effect on June 1 (Figure 3). The return of Iraqi oil exports to pre-war levels is not expected to lead to a sharp price decline in 2004 because it is assumed that, based on the surprise decision in September to cut quotas beginning November 1 and the possibility of further adjustments, overall OPEC production (including natural gas liquids) will not increase next year and may fall by 2-3 percent from the 2003 average.

International Oil Demand and Supply. World oil demand is projected to grow by about 1 million barrels per day in 2003 and in 2004, slightly less than the projected growth in non-OPEC oil production of 1.3 million barrels per day in 2004 (Figure 4). About 1/3 of the growth in world oil demand in 2003 is projected to come from the U.S., with China and other non-OECD countries projected to provide a total of another 0.5 million barrels per day of demand growth.

U. S. Energy Prices

Motor Gasoline: The October average motor gasoline price (regular unleaded gasoline) dropped to \$1.56 per gallon compared to \$1.68 in September. Motor gasoline prices have been drifting downward, as expected, following the late summer price surge (Figure 5). Pump prices should continue to decrease through the winter, as crude oil prices and margins continue to ease. However, the relatively tight levels of gasoline inventories should act as a brake on a more accelerated price drop. By the end of October, gasoline inventories remained just above the 5-year min/max range (Figure 6). In 2004, the annual pump price is projected to average \$1.46 per gallon (down roughly 11 cents per gallon from the projected 2003 average), as crude oil prices and average annual refiner margins recede. (Here, "refiner margin" refers to the difference between the average refiner price for gasoline and the average per-gallon crude oil input cost.) This year, refiner margins soared in March and again in August and September as supplies of gasoline fell to low levels. Next year, the assumption of higher (but still tight) stock levels for gasoline should reduce slightly the average refiner margin.

Some uncertainties remain in our projections about the gasoline market during the next several months, particularly in the Mid-Atlantic and New England regions, because several large states have mandated changes in fuel additives. New York and Connecticut use Federal reformulated gasoline (RFG) that contains methyl tertiary butyl ether (MTBE). MTBE is used in RFG to meet the minimum 2.0 percent oxygen weight requirement, to reduce gasoline's air emissions, and to improve engine performance. However, detection of MTBE in some ground water supplies has led these two states to ban its use in gasoline by the end of 2003. MTBE, which makes up about 11 percent of a gallon of RFG, will be replaced by fuel ethanol. The MTBE bans introduce significant uncertainties to Northeast gasoline markets. It is more difficult and costly to produce RFG with ethanol and the MTBE ban introduces an additional constraint to the supply system. While supply is expected to be adequate, developments during the phaseout of MTBE from gasoline in California earlier this year and the Midwest's past experience with ethanol-based RFG over the past few years suggest a greater potential for temporary price spikes. For a comprehensive analysis of the Connecticut and New York gasoline markets and MTBE bans refer to the EIA report, "Preparations for Meeting New York and Connecticut MTBE Bans," October 2003.

Recently, California's weekly price for regular motor gasoline was \$1.71 per gallon, or about 17 cents per gallon higher than the national average price of \$1.54 per gallon. The price difference has narrowed over the last month.

Distillate Fuel Oil (Diesel Fuel and Heating Oil): As expected, residential heating oil prices have risen as the first month of the heating season has passed. Diesel fuel oil prices, on the other hand, have eased over this same time period. Diesel prices are normally expected to increase this time of year, pushed by the seasonal demand patterns of heating oil. Currently, a weakening in crude oil prices and a healthy level of distillate inventories has mitigated steeper upward price movements for this fuel. Heating oil prices this winter season (October-March), are likely to average about \$1.32 per gallon, or about the same as last winter's average price (Figure 7). Nevertheless, this winter may see price spikes, especially if winter weather on the East Coast turns abnormally cold for prolonged periods or if world oil prices increase substantially. Cold weather alone could add an additional 10-15 cents per gallon to the base case projections and perhaps even more at the local level. At the end of October, distillate fuel oil inventories were almost 133 million barrels, a level in the middle of the 5-year min/max range (Figure 8).

Natural Gas: Mild weather during the last 4-5 months (a relatively cool summer followed by a warm early autumn) reduced industrial demand, and a modest production response to increased drilling contributed to historically high volumes of gas injections into underground storage, which has resulted in robust levels of natural gas stocks. Inventories of working gas are now comfortably above the middle of the 5-year average range. Nearly 3.2 trillion cubic feet of working gas were in storage by November 1. Historically, the gas industry regards any level over 3.0 million cubic feet of gas working gas in storage by November 1 as a sufficient amount to meet the heating season demand unless very severe winter weather conditions prevail. On October 31, the cash price at the Henry Hub dipped below \$4.00 per mmBtu (\$3.98 per mmBtu), reaching the lowest price of the year. Assuming our base case weather forecast, spot prices in the \$4.50-\$5.00 per mmBtu range (or \$4.64-\$5.15 per mcf) can be expected for the winter of 2003-2004 (Figure 9).

For 2003, wellhead prices are projected to show an increase of almost \$2.00 per thousand cubic feet (mcf) (still the largest U.S. annual wellhead price increase on record) over the 2002 annual average, pushing the annual average for the year to about \$4.90 per mcf. However, average annual wellhead prices in 2004 are projected to drop by \$0.90 per mcf (about 18 percent), pushed down by significant gains in net imports of natural gas (5 percent over 2003 levels compared to a net decrease from the previous year's level), a more robust storage situation throughout the entire year, slow gas demand growth, and a projected decline in crude oil prices.

U. S. Oil Demand

This year, total petroleum demand is projected to increase by 243,000 barrels per day from last year's average, or 1.2 percent, to 20.00 million barrels per day (Figure 10). Demand for motor gasoline, the largest oil-based product, is also projected to increase 1.3 percent for the year. While motor gasoline demand growth was nearly flat during the first half of the year as a result of lack of growth in highway travel (due in part to harsh weather conditions during the first quarter), a 2.4-percent increase in motor gasoline demand over the second half of the year is anticipated due to the resumption of growth in highway travel brought about by the general improvement in the economy.

Jet fuel markets, having been adversely affected by several outbreaks of the SARS epidemic as well the Iraqi military campaign earlier in the year, are expected to remain sluggish for the rest of the year as well. For the first half of 2003, revenue ton-miles showed little growth, but capacity continued to expand. Moreover, recently published FAA data show continued year-to-year declines in jet fuel purchases. Airlines, seeking to increase load factors, have announced plans to trim capacity further during the rest of this year. As a result, commercial jet fuel demand is projected to contract by about 1 percent in 2003.

Moreover, domestic military demand will likely show a decline as a result of an increase in overseas activity (particularly in the first half of the year), contributing to the projected year-over-year decline of 2.6 percent in total jet fuel demand.

Distillate fuel oil use is projected to increase 3.9 percent in 2003. Demand during the first half of the year increased 7 percent as a result of harsh weather during the first quarter and high sales to the power generation sector during the spring and summer in the wake of spikes in natural gas prices. Transportation demand, the largest distillate component, is projected to increase 3.0 percent for the year as a whole, reflecting continued growth in overall economic activity. Residual fuel oil demand, bolstered by high space-heating demand during the first quarter and firm natural gas prices throughout the year, is projected to register an increase of 10.7 percent this year. The same weather- and price-related factors that boosted distillate demand during the first half of the year also brought about an 11.3-percent increase in demand for residual fuel oil during that period. Moreover, recent data point to a 27-percent increase in third quarter demand. However, a decline in the relative price of natural gas and the assumption of normal weather patterns are expected to bring about a 4.1-percent decline in residual demand in the current quarter. Despite the colder-than-average weather in first quarter, liquefied petroleum gas demand is projected to decline 5.5 percent for the year as a whole, largely as a result of weakness in petrochemical activity as well as high natural gas prices and higher production costs for much of the year.

Petroleum demand growth in 2004 is projected to average 310,000 barrels per day, or 1.5 percent, to 20.31 million barrels per day. All the major products, except residual fuel oil, are expected to contribute to that growth. Motor gasoline demand is projected to increase 2.2 percent, reflecting a continued acceleration of economic growth and an almost 9-percent decline in retail pump prices. Jet fuel demand, having declined for two consecutive years, is projected to post a growth rate of 1.6 percent to average 1.60 million barrels per day, still below the 2001 average. Distillate demand growth is projected to moderate to 1.7 percent, as demand reductions resulting from the assumption of more normal weather partly counteracts the projected 3.1-percent growth in transportation diesel demand. Residual fuel oil deliveries, having experienced growth in 2003, are projected to decline by 6 percent in 2004. That reversal reflects the assumptions of more or less normal weather and greater availability of natural gas, prices of which are projected to decline to levels that more effectively compete with other fossil fuels. Demand for liquefied petroleum gas is expected to recover smartly from the weaknesses of the previous year, with growth averaging 4 percent. Growth in petrochemical activity and declines in natural gas feedstock prices are both expected to offset the decline in space-heating demand

under baseline assumptions of normal weather during the 2003-2004 winter season.

Oil Supply

Average domestic oil production is expected to decrease in 2003 by 11 thousand barrels per day, or 0.2 percent, to a level of 5.74 million barrels of oil per day. For 2004, a 1.7 percent decline is expected, resulting in an average annual production rate of 5.64 million barrels of oil per day (Figure 11).

Lower-48 States oil production is expected to decrease by 5,000 barrels per day to a rate of 4.76 million barrels per day in 2003, followed by a decline of 67,000 barrels per day in 2004. Oil production from the Mars, Mad Dog, Ursa, Thunder Horse and Nakika Federal Offshore fields is expected to account for about 12 percent of the lower-48 oil production by the 4th quarter of 2005.

Alaska is expected to account for 16.8 percent of total U.S. oil production in 2004. Alaskan oil production is expected to decrease by 0.6 percent in 2003 and decrease by 3.2 percent in 2004. The combined production rate from the two significant fields, Alpine and North Star, averaged nearly 173 thousand barrels per day during June 2003. Production from the Kuparuk River field plus the production from West Sak, Tobasco, Tarn and Meltwater fields is expected to stay at an average of 210 thousand barrels per day over the forecast period.

Natural Gas Supply and Demand

Natural gas demand is expected to fall by 2 percent in 2003 as high prices discourage demand, particularly in the industrial and electric power sectors (Figure 12). A modest increase of nearly 1 percent in consumption is projected for 2004 driven by strong economic growth and projected lower prices.

This winter, demand for natural gas is expected to be about 2 percent lower than last winter's level, due largely to the effect of weaker heating-related demand. Gas-weighted heating degree-days for the season (Q4 2003 and Q1 2004), under our baseline weather projections, would be about 2.5 percent below yearago levels. Winter natural gas prices are projected to be about 10.5 percent

higher than last winter in the residential sector as cumulated natural gas utility costs through 2003 are recovered in higher household delivered charges. In the event of colder-than-expected weather this winter, natural gas prices could go higher.

Working natural gas in storage is estimated to be near 3.2 billion cubic feet (Bcf) at the end of October, over 3 percent above the 5-year average level (Figure 13). This is the result of the higher-than-normal storage injections that have characterized the 2003 stockbuild period.

Natural gas production is expected to show increases of about 3 percent this year. High natural gas prices and sharply higher oil and natural gas field revenues have resulted in strong natural gas-directed drilling activity this year following the downturn in 2002 (Figure 14). Monthly oil and natural gas field revenues are expected to continue to average over \$400 million this year (Figure 15). The prospects for significant reductions in natural gas wellhead prices over the forecast period hinge significantly on the productivity of the increased drilling in terms of expected output. An average natural gas wellhead price of about \$3.99 per thousand cubic feet (mcf) is projected for 2004, about \$0.90 per mcf lower than the expected 2003 average, based on the assumption that, barring severe weather this winter, pressure on natural gas markets related to storage refill will be considerably less in 2004 than in 2003.

Electricity Demand and Supply

Electricity demand in 2003 is expected to remain at close to last year's levels (Figure 16). Following the relative increase in demand in the first quarter due to cold weather, declines in demand occurred during the second and third quarters, also driven largely by weather factors, i.e., lower cooling demand this summer than last summer. In 2004, annual electricity demand is projected to rebound, growing along with the economy at a rate of about 2.4 percent.

Natural gas-fired electricity production is expected to decrease by about 4 percent in 2003 due to fuel substitution in response to high natural gas prices, as indicated by increasing oil-fired plant utilization beyond what otherwise might have been projected. Also in 2003, petroleum-generated electricity production is expected to increase by about 21 percent. In 2004, petroleum-generated electricity production is projected to decline about 5.8 percent as natural gas availability improves. Hydroelectric generation in 2003 is expected to increase by 4.8 percent overall due to improved water levels in the Eastern half of the country. Nuclear generation in 2003 is expected to be lower than last year by 1.8 percent. Part (at least) of the reason for the lower nuclear generation is that two

nuclear plants have been in extended shutdown mode. However, nuclear and hydropower for electricity generation are expected to be more abundant this winter than last winter. Nuclear plants that experienced extended outages are expected to be back on line in 2004, when nuclear generation increases 2.4 percent over 2003 levels. Hydroelectric generation is also expected to increase in 2004 due to the somewhat recovered levels of precipitation this year.

Coal Demand and Supply

Coal consumed to generate electricity climbed 3.3 percent during the first seven months of 2003, compared to the same period in 2002. Coal, nuclear and gas-fired generation are typically used to meet baseload demand, although natural gas is also the primary peaking demand fuel. Year-to-date nuclear generation is down 2.4 percent and natural gas-fired generation is down 9.5 percent. Coal-fired generation, up 2.5 percent, has taken up the slack in baseload demand. Despite flatness in total electricity demand and total electric sector generation, coal-fired electricity generation is expected to grow by 0.4 percent and electric sector coal consumption to grow by 1.0 percent in 2003 (Figure 17). Coal-fired generation and associated coal consumption is expected to continue growing in 2004, as generation grows at 0.8 percent while consumption rises by 1.2 percent.

Demand in other coal-consuming sectors is expected to grow moderately in 2003. Expected increases in the coke plant sector (1.9 million short tons (mmst) or 8.2 percent) are nearly offset by a projected decline in consumption in the retail and general industry sectors (1.5 mmst or 2.3 percent). Total non-electric sector coal demand growth for 2003 is projected to be 0.3 percent. Non-electric sector growth is expected to decline in 2004, (0.8 percent) as demand for coal as a boiler fuel continues to decline and coke plant demand falls.

Total U.S. coal production is expected to decline by 0.6 percent in 2003 (Figure 18). Year-to-date U.S. coal production (January through September) is roughly 802.5 mmst, or 2.2 percent lower than the same period of 2002. Western region coal production is likely to grow 1.5 percent, while Appalachian and Interior production falls 3.4 percent and 1.1 percent respectively. In 2004, growth in electric sector coal demand is expected to lead to an increase in total coal production (0.8 percent), but Western region coal production is projected to continue its strong growth at a rate of 4.5 percent.

Representation of Uncertainty in STEO Using the STIFS Model

The EIA uses its Short-Term Integrated Forecasting System (STIFS) model to analyze monthly trends in U.S. energy demands and prices, both nationally and by sector, and to generate its monthly *Short-Term Energy Outlook (STEO)*. This model consists of approximately 920 endogenous variables, 216 of which are stochastic (i.e., have error distributions associated with them).

Confidence intervals presented in the *STEO* for a selected STIFS variable, such as the crude oil price, gasoline price and natural gas spot price, are analytically calculated using information about the error distribution of the modeled variable and the error distributions of any endogenous variables that may affect the variable of interest. These confidence intervals, based on +/- 2 standard errors within the STIFS model, do not include the impact of major supply disruptions and other phenomena not represented in the model.

To the extent that supply disruptions in world oil markets and/or other phenomena not included in the STIFS model do significantly affect future market developments, confidence intervals presented in the *STEO* likely will be less than the usual 95 percent, all other factors being equal.

Table HL1. U.S. Energy Supply and Demand: Base Case

(Energy Information Administration\Short-Term Energy Outlook -- November 2003)

		Year			Annual Percentage Change			
	2001	2002	2003	2004	2001-2002	2002-2003	2003-2004	
Real Gross Domestic Product (GDP)					· · · · · · · · · · · · · · · · · · ·			
(billion chained 1996 dollars)	9215	9440	9702	10101	2.4	2.8	4.1	
Imported Crude Oil Price ^a								
(nominal dollars per barrel)	22.00	23.69	27.54	24.68	7.7	16.3	-10.4	
Petroleum Supply (million barrels per day)								
Crude Oil Production ^b	5.80	5.75	5.74	5.64	-1.0	-0.2	-1.7	
Total Petroleum Net Imports								
(including SPR)	10.90	10.54	11.26	11.46	-3.3	6.8	1.8	

Energy Demand

World Petroleum							
(million barrels per day)	77.1	77.6	78.6	79.7	0.6	1.3	1.4
Petroleum							
(million barrels per day)	19.65	19.76	20.00	20.31	0.6	1.2	1.5
Natural Gas							
(trillion cubic feet)	22.23	22.52	22.06	22.26	1.3	-2.0	0.9
2.10							
Coal ^c							
(million short tons)	1060	1066	1076	1087	0.5	0.9	1.0
Electricity (billion kilowatthours)							
• •	0070	0.475	0.470	2560	3.1	0.1	2.4
Retail Sales ^d	3370	3475	3478	3560			
Other Use/Sales ^e	173	180	176	182	4.2	-2.3	3.5
Total	3543	3655	3654	3742	3.2	0.0	2.4
Total Energy Demand ^f							
(quadrillion Btu)	96.3	97.6	97.6	99.6	1.3	0.0	2.1
Total Energy Demand per Dollar of							
GDP							
(thousand Btu per 1996 Dollar)	10.45	10.34	10.06	9.86	-1.1	-2.7	-1.9
Renewable Energy as Percent of Total	5.6%	6.2%	6.4%	6.6%			

^aRefers to the refiner acquisition cost (RAC) of imported crude oil.

^bIncludes lease condensate.

[°]Total Demand includes estimated Independent Power Producer (IPP) coal consumption

^dTotal of retail electricity sales by electric utilities and power marketers. Utility sales for historical periods are reported in EIA's Electric Power Monthly and Electric Power Annual. Power marketers' sales for historical periods are reported in EIA's Electric Sales and Revenue, Appendix C. Data for 2001 are estimates.

^eDefined as the sum of facility use of onsite net electricity generation plus direct sales of power by industrial-or commercial-sector generators to third parties, reported annually in Table 7.5 of the Monthly Energy Review (MER). Data for 2001 are estimates.

^fThe conversion from physical units to Btu is calculated by using a subset of conversion factors used in the calculations performed for gross energy consumption in Energy Information Administration, Monthly Energy Review (MER). Consequently, the historical data may not precisely match those published in the MER or the Annual Energy Review (AER).

⁹Renewable energy includes minor components of non-marketed renewable energy, which is renewable energy that is neither bought nor sold, either directly or indirectly, as inputs to marketed energy. The Energy Information Administration does not estimate or project total consumption of non-marketed renewable energy.

SPR: Strategic Petroleum Reserve.

Notes: Minor discrepancies with other published EIA historical data are due to independent rounding. Historical data are printed in bold; forecasts are in italics. The forecasts were generated by simulation of the Short-Term Integrated Forecasting System.

Sources: Historical data: Latest data available from Bureau of Economic Analysis and Energy Information Administration; latest data available from EIA databases supporting the following reports: Petroleum Supply Monthly, DOE/EIA-0109; Petroleum Supply Annual, DOE/EIA-0340/2; Natural Gas Monthly, DOE/EIA-0130; Electric Power Monthly, DOE/EIA-0226; and Quarterly Coal Report, DOE/EIA-0121; International Petroleum Monthly DOE/EIA-0520; Weekly Petroleum Status Report, DOE/EIA-0208. Macroeconomic projections are based on Global Insight Forecast CONTROL1003.

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