Independent Statistics & Analysis
U.S. Energy Information Administration

The Availability and Price of Petroleum and Petroleum Products Produced in Countries Other Than Iran

The second in a series of reports required by section 1245 (d) (4) (A) of the National Defense Authorization Act for Fiscal Year 2012

April 27, 2012

Independent Statistics & Analysis
www.eia.gov

U.S. Department of Energy
Washington, DC 20585

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Summary

This is the second in a series of reports prepared in fulfillment of Section 1245(d)(4)(A) of the National Defense Authorization Act (NDAA) for Fiscal Year 2012, which requires that, not later than 60 days from enactment and every 60 days thereafter, the U.S. Energy Information Administration (EIA) "submit to Congress a report on the availability and price of petroleum and petroleum products produced in countries other than Iran in the 60-day period preceding the submission of the report." As specified by the NDAA, EIA consulted with the Department of Treasury, the Department of State, and the intelligence community in the process of developing this report.

The statutory language in the NDAA clearly envisions a report that is primarily, if not exclusively, backward-looking in nature. In contrast to data on petroleum and petroleum product volumes, price data is available on a real-time or near-real-time basis. Over the five days ending April 25, the price of the front-month futures contract for Brent crude, a proxy for the global price of light sweet crude grades not subject to transportation bottlenecks, averaged $118.55 per barrel, a $7 per barrel decline from its average over the March 9 - 14 period when prices were at their highest level for 2012. Although lower than their peak in mid-March, prices are still well above their level at the start of the year. Also, the market remains backwardated, with front month prices over the five days ending April 25 about $5 per barrel above those for delivery 12 months in the future. Although backwardation has eased since the end of February, when the price difference between the front month and 12-month contracts was $7.69 for the five days ending February 27, the continuing premium on contracts for near-term delivery is still indicative of tightness in world oil markets.

It is important to recognize that due to time lags in the collection of production and consumption data, nearly all of the petroleum and petroleum product volumes presented in this report for the 60-day period preceding its publication are estimates rather than actual data. As discussed in the remainder of this summary section and in the body of this report, EIA estimates that global liquid fuels consumption is at a historically high level. While the global economic outlook remains uncertain, continued growth is expected. EIA estimates that global liquid fuels production exceeded consumption by an average of 0.5 million barrels per day (bbl/d) in March and April. Inventories in the United States were estimated to have risen by an average of 0.2 million bbl/d in March and April 2012, while commercial inventories in other member states of the Organization for Economic Cooperation and Development (OECD) built by an estimated 0.1 million bbl/d over the same timeframe. Though data on non-OECD inventories are very limited, the implied build in non-OECD stocks averaged 0.2 million bbl/d in March and April. During these two months, there were numerous press reports that Iranian oil exports to other countries were lower than Iranian volumes available for export, causing Iran to accumulate, perhaps involuntarily, additional crude oil inventories (Wall Street Journal, Reuters).

With respect to supply, there has been a changing pattern of unplanned oil production disruptions. Total global unplanned production outages generally declined over the last quarter of 2011 and in January 2012 as Libyan output rose steadily following the defeat of the Gaddafi regime. However, despite a continued rise in Libyan output, total global unplanned production outages rose above their January 2012 level in February, March, and April. Technical issues affecting production in Canada and

political issues affecting output in South Sudan, Sudan, Syria, and Yemen were key contributors to this outcome.

In addition, both the United States and the European Union (EU) have acted to tighten sanctions against Iran, including measures with both immediate and future effective dates. Press reports indicate that these measures may already be causing some of Iran's existing oil customers to make arrangements to switch to non-Iranian crudes. Sanction-related difficulties in insuring Iranian shipments, both to European and Asian countries, have likely contributed to further declines in purchases of Iranian crude. EIA believes that Iran's total liquids production capability has been declining due to its inability to carry out investment projects that are necessary to offset the natural decline in its production from existing wells. Actual Iranian production over the last two months is approximately 0.4 million bbl/d lower than its year-ago average, while Iran's consumption is estimated to have increased by 0.1 million bbl/d over the same period, which indicates a decline in oil export capacity of 0.5 million bbl/d. However, media reports (Wall Street Journal, Reuters) indicate the decrease in actual oil exports has been larger that the decline in export capacity, which has resulted in Iran accumulating increasing levels of stocks in onshore and "on the water" storage.

Partially offsetting these supply disruptions, there have been significant production increases from two non-OPEC producers. Notably, due to increasing production from tight oil plays, U.S. liquids production in March 2012 was between 0.1 and 0.2 million bbl/d above its average level during the fourth quarter of 2011. Likewise, Kazakhstan increased its oil production almost 0.2 million bbl/d over the same period.

Finally, current spare crude oil production capacity, while estimated to be higher than during the 2003 to 2008 period, is quite modest by historical standards, especially when measured as a percentage of global oil production and considered in the context of current geopolitical uncertainties, including, but not limited to, the situation in Iran. With the rise in total global unplanned production outages over the last three months and the likely increase in non-discretionary inventories controlled by Iran, global spare capacity in March and April was estimated to average 2.5 million bbl/d, roughly equal to the average level in January and February.

Market Indicators Considered in this Report

In addition to estimated volumes of production and consumption and spot market and futures prices, this report focuses on a variety of other indicators of volumes, spare production capacity, and price spreads relevant to the "availability and price of petroleum and petroleum products."

Spare capacity, which EIA defines as the amount of additional production that can be brought onstream within 30 days and sustained for at least 90 days, consistent with sound business and reservoir management practices, is an indicator of the world oil market's ability to respond to potential disruptions that reduce oil supply. Oil prices tend to rise when spare capacity reaches very low levels, as occurred in the 2003 to 2008 period.

Crude oil and petroleum product inventories, also referred to as stocks, act as the balancing point between supply and demand. Given the uncertainty of supply and demand, inventories are often seen as a precautionary measure and, along with spare capacity, serve to cushion the market in addressing

negative supply shocks and/or positive demand shocks. The term structure of prices for future delivery, discussed below, is one factor that signals the market to build or reduce stocks.

Petroleum and petroleum product prices are indicators of the relative balance of supply and demand. Rising prices suggest that demand is growing more rapidly (or declining at a slower rate) than supply, while falling prices imply that demand is growing less quickly (or falling more rapidly) than supply. Prices also reflect expectations regarding future changes in the balance between supply and demand, which can be influenced by a variety of supply and demand drivers. This report reflects price data through April 25, 2012.

Differences in prices, commonly referred to as price spreads, also convey important information about the current state of the market and market expectations. The term structure of prices for future delivery is one key indicator of market participants' expectations regarding changes in market tightness over time. For example, the difference between the price of the front month and twelfth month futures contracts provides insight into current market tightness relative to expectations for the coming year. A positive difference, referred to as backwardation, indicates tightness in the current market, while a negative difference, called contango, indicates a relatively looser near-term supply-demand balance and encourages stock building.

There are a variety of other spreads that also provide important market insights. These include the price spread across different crude streams which can arise due to differences in physical characteristics (for example, American Petroleum Institute [API] gravity and sulfur content) or their location. With respect to location, transportation bottlenecks can result in significant price differences between physically similar crudes in markets with different balances between crude supply and demand.

The price spread between crude oil and refined products, often referred to as a crack spread, provides an indication of the relative tightness in the supply-demand balance for different petroleum products. In recent years, the crack spread for distillate fuels (a category that includes diesel fuel and heating oil) has generally been greater than the crack spread for gasoline. Crack spreads also provide insight into the profitability of refining operations, which is often a reflection of the availability of refinery capacity relative to the demand for refined products.

The value of options on futures contracts is another current indicator of forward-looking market sentiment. Call options provide the holder with the right to buy a commodity at a specified price up to a specified future date, while put options provide the right to sell at a specified price up to a specified future date. Given strike prices and the time to expiration, the value of options contracts can be used to calculate the market's current assessment of the uncertainty range for future prices and/or the market's view that prices for future delivery at specified dates will exceed or fall below any particular level.

Estimates of Production, Consumption, Spare Capacity and Inventories

Because Iran participates in the global oil market and because biofuels are a close substitute for petroleum products, this report examines "availability and price" in the global liquid fuels market. The term "liquid fuels" encompasses petroleum and petroleum products and close substitutes, including crude oil, lease condensate, natural gas plant liquids, biofuels, coal-to-liquids, gas-to-liquids, and refinery processing gains.

Once the availability of global liquid fuels is established, EIA estimates the volume of "petroleum and petroleum products produced in countries other than Iran" by subtracting global biofuels and liquid fuels produced and consumed in Iran from the global liquid fuels totals.

Looking at the total global market during March and April, EIA estimates that world liquid fuels production averaged 88.7 million bbl/d, which is 2.4 million bbl/d higher than the comparable year-ago average of 86.2 million bbl/d and 2.6 million bbl/d higher than the three-year annual average of 86.1 million bbl/d **(Table 1)**. During this same period, EIA estimates that global liquid fuels consumption averaged 88.2 million bbl/d, 0.9 million bbl/d higher than the comparable year-ago period and 1.6 million bbl/d higher than its previous three-year annual average.

During the last two months, EIA estimates that liquid fuels production and consumption in Iran were 3.9 million bbl/d and 1.7 million bbl/d, respectively. Iran is the world's fifth-largest producer of liquid fuels – accounting for between 4 and 5 percent of global supply – and the third-largest exporter of crude oil. Iran's crude oil production capacity has eroded in recent years, due to its inability to carry out investment projects that are necessary to offset the natural decline in production from existing wells. Although its output of lease condensate and natural gas liquids has increased somewhat, these increases have not been enough to offset the decline in crude oil production, and EIA estimates that Iran's total liquids production capability has fallen. In addition, Iran has historically been a net importer of petroleum products, particularly gasoline, since its consumption levels exceed its own refining capacity.

In March and April 2012, EIA estimates consumption of petroleum and petroleum products in countries other than Iran averaged 84.7 million bbl/d. During the same period, EIA estimates that production of petroleum and petroleum products in countries other than Iran averaged 82.9 million barrels bbl/d, which is 2.8 million bbl/d or 3 percent higher than the three-year annual average from 2009 through 2011 **(Table 1)**.

As a result, EIA estimates global oil inventories grew by an average of 0.5 million bbl/d during the past two months. As mentioned above, the growth in global oil inventories includes growth in Iranian oil inventories, as sanctions have caused some disruption in Iranian oil sales.

Currently, all of the world's spare crude oil production capacity is held by the member countries of the Organization of the Petroleum Exporting Countries (OPEC), and largely by Saudi Arabia. EIA estimates that spare OPEC oil production capacity averaged 2.5 million bbl/d during March and April, roughly equal to the average level of spare capacity in January and February. Spare oil production capacity is currently quite modest relative to historical levels, including an average of 3.6 million bbl/d in the comparable year-ago period and a 2009-2011 average of 3.5 million bbl/d. Spare capacity must also be considered in the context of current geopolitical uncertainties, including, but not limited to, the situation in Iran.

Crude Oil and Petroleum Product Prices

Crude oil prices have declined slightly after increasing from February through mid-March. These changes are reflected in price movements on the most commonly traded oil futures contracts. Comparing the 5-day periods ending February 27, 2012 and April 25, 2012, the price of the front month

of the New York Mercantile Exchange (NYMEX) light sweet crude oil contract (WTI) declined from $107.66 per barrel to $103.22 per barrel. The Brent front month price, which is widely viewed as being more representative of global prices for light sweet crude oil, declined from $123.56 to $118.55 per barrel over the same period. WTI and Brent prices have declined by $4.94 and $7.04 per barrel, respectively, from their 2012 peaks of $108.16 per barrel on March 1 and $125.59 per barrel on March 14.

During March and April 2012, petroleum and petroleum product prices were higher than they had been on average over the last three years. The average of the monthly price for March and April of the front month WTI contract was $104.87 per barrel and the two-month average for the Brent front month contract was $122.80 per barrel. These prices were $25.93 and $38.16 per barrel higher than the three-year averages and $3.58 and $7.55 per barrel higher than their January and February 2012 averages, respectively.

The 1st – 12th month spread for Brent had a March and April average of $6.58 per barrel, indicating a relative current tightness in the world waterborne crude market. The Brent curve has been in backwardation since summer of 2011, in contrast to the three-year average of -$3.08 per barrel. The WTI spread, on the other hand, is in contango, averaging -$1.36 per barrel between March and April, but this is a much smaller spread than the three-year average of -$5.39 per barrel. The contango for WTI likely reflects transportation bottlenecks in the midcontinent region and future plans to ameliorate them by reconfiguring existing pipelines and building new ones.

For the five days ending April 25, the average price of the September 2012 WTI crude oil futures contract was $104.53 per barrel and the average price of the September 2012 Brent contract was $117.46 per barrel. The WTI and Brent prices for the 5-day average ending April 25 for the September 2012 contract have decreased by about $4 per barrel and $2.50 per barrel, respectively, since the end of February. Based on implied volatilities calculated from options and futures prices over the 5 days ending April 25, the probability of the September 2012 WTI futures contract expiring above $120 per barrel is 15 percent, a 13-percentage-point decrease relative to the same calculation made using price data from the 5-day period ending February 27. Since Brent prices are currently higher relative to WTI prices, the probability that the September Brent contract will exceed specified dollar thresholds is higher for Brent.

Reformulated blendstock for oxygenate blending (RBOB) is an unfinished gasoline that requires blending with an oxygenate, such as ethanol, before being sold. RBOB (or Eurobob in Europe) is often traded instead of finished motor gasoline that already has been blended with ethanol since oxygenate blending typically takes place at terminals along the distribution chain.

RBOB prices have been generally rising over the past two months, although they began to decrease in recent weeks. Comparing the 5-day periods ending February 27, 2012 and April 25, 2012, the price of the front month of the NYMEX RBOB contract, which calls for delivery in New York Harbor, rose from $3.11 per gallon to $3.16 per gallon. During March and April, the average price for the front month of the RBOB futures contract was $3.31 per gallon, $1.09 per gallon higher than the average front month price over the three-year period from 2009-2011, and $0.17 per gallon higher than the March and April

2011 average. It should be noted that some of the increase in RBOB futures prices over the last 60 days is due to the switch from winter grade gasoline to more expensive summer grade gasoline.

The average price of the September 2012 RBOB futures contract for the 5-day period ending April 25 was $3.00 per gallon, a decrease of 11 cents per gallon from the average of $3.11 for the 5-day period ending February 27. Based on implied volatilities calculated from options and futures prices over the 5 days ending April 25, the probability of the September 2012 RBOB futures contract expiring above $3.35 per gallon (comparable to a $4.00 per gallon national average retail price for regular grade gasoline) is 21 percent, an 11-percentage-point decrease from the result of the same calculation made using data for the 5-day period ending February 27.

Table 1. Summary of Estimated Liquid Fuels Quantities and Prices

Item	March 2012	April 2012	Mar. 2012 - Apr. 2012 Average	Mar. 2011 - Apr. 2011 Average	2009 - 2011 Average
Total Global Liquid Fuels					
Total Global Liquid Fuels Production (million bbl/d)	88.5	88.9	88.7	86.2	86.1
Total Global Liquid Fuels Consumption (million bbl/d)	88.4	88.0	88.2	87.3	86.6
Biofuels Production (a) (million bbl/d)	1.9	1.9	1.9	1.9	1.8
Biofuels Consumption (a) (million bbl/d)	1.8	1.8	1.8	1.8	1.7
Iran Liquid Fuels Production (million bbl/d)	3.9	3.9	3.9	4.3	4.2
Iran Liquid Fuels Consumption (million bbl/d)	1.8	1.7	1.7	1.6	1.8
Petroleum and Petroleum Products Produced and Consumed in Countries Other Than Iran					
Production (b) (million bbl/d)	82.7	83.1	82.9	80.1	80.1
Consumption (c) (million bbl/d)	84.9	84.5	84.7	83.9	83.1
Production minus Consumption	-2.1	-1.4	-1.8	-3.8	-3.0
World Inventory Net Withdrawals Including Iran (million barrels)	-0.1	-0.9	-0.5	1.0	0.5
Estimated OECD Inventory Level (d) (million barrels)	2,619	2,628	2,624	2,636	--
Spare Production Capacity					
OPEC Spare Crude Oil Production Capacity (e) (million bbl/d)	2.5	2.4	2.5	3.6	3.5
Oil Price Level					
WTI Front Month Futures Price ($ per barrel)	106.2	103.1	104.9	106.5	78.9
Brent Front Month Futures Price ($ per barrel)	124.5	120.5	122.8	118.9	84.6
RBOB Front Month Futures Price ($ per gallon)	3.3	3.3	3.3	3.1	2.2
Oil Price Time Spread					
WTI 1st - 12th Month Futures Spread ($ per barrel)	-1.2	-1.6	-1.4	-1.2	-5.4
Brent 1st - 12th Month Futures Spread ($ per barrel)	7.2	5.9	6.6	3.3	-3.1

Note: The term "liquid fuels" encompasses crude oil, lease condensate, natural gas plant liquids, biofuels, coal-to-liquids, gas-to-liquids, and refinery processing gains, which are important to consider in concert due to the inter-related supply, demand, and price dynamics of petroleum, petroleum products, and related fuels. (a) Biofuels production and consumption are based on EIA

estimates for 2010 as published in the International Energy Statistics. (b) Production includes crude oil (including lease condensates), natural gas plant liquids, other liquids, and refinery processing gains.
(c) Consumption of petroleum by the OECD countries is synonymous with "products supplied," defined in the glossary of the EIA Petroleum Supply Monthly, DOE/EIA-0109. Consumption of petroleum by the non-OECD countries is "apparent consumption," which includes internal consumption, refinery fuel and loss, and bunkering.
(d) Estimated inventory level is for OECD only.
(e) EIA defines spare oil production capacity as potential oil production that could be brought online within 30 days and sustained for at least 90 days, consistent with sound business practices. This does not include oil production increases that could not be sustained without degrading the future production capacity of a field.
Source: U.S. Energy Information Administration

Report Background and Context

The Availability and Price of Petroleum and Petroleum Products Produced in Countries Other Than Iran is a 60-day recurring report required under Section 1245(d)(4)(A) of Public Law 112-81, the National Defense Authorization Act for Fiscal Year 2012, signed into law on December 31, 2011. The Act requires that, not later than 60 days from enactment and every 60 days thereafter, the "Energy Information Administration, in consultation with the Secretary of the Treasury, the Secretary of State, and the Director of National Intelligence, shall submit to Congress a report on the availability and price of petroleum and petroleum products produced in countries other than Iran in the 60-day period preceding the submission of the report."

This report and its future editions are intended to provide information relevant to the President's determination under Section 1245(d)(4)(B) whether the "price and supply of petroleum and petroleum products produced in countries other than Iran is sufficient to permit purchasers of petroleum and petroleum products from Iran to reduce significantly in volume their purchases from Iran."

Because Iran participates in the global oil market and because biofuels are a close substitute for petroleum products, this report examines "availability and price" in the global liquid fuels market. The term "liquid fuels" encompasses petroleum and petroleum products and close substitutes, including crude oil, lease condensate, natural gas plant liquids, biofuels, coal-to-liquids, gas-to-liquids, and refinery processing gains.

Once the availability of global liquid fuels is established, EIA estimates the availability of "petroleum and petroleum products produced in countries other than Iran" by subtracting global biofuels and liquid fuels produced and consumed in Iran from the global liquid fuels totals.

In 2011, EIA estimates that Iran was the world's fifth-largest supplier of total liquid fuels – producing an average of 4.2 million bbl/d and accounting for between 4 and 5 percent of global supply. In 2009 and 2010, Iran's total liquid fuels production had been 4.2 million bbl/d and 4.3 million bbl/d, respectively. Iran is the third-largest exporter of crude oil. Though Iran's crude oil production capacity has eroded in recent years, increases in output of lease condensate and natural gas liquids have partially offset declines in crude oil production since the beginning of 2011. Iran has historically been a net importer of petroleum products, particularly gasoline, since its consumption of liquid fuels exceeds its own refining capacity.

Essentially all of the volume data presented in this report are estimates that are subject to change as more information becomes available. For many countries, official monthly liquid fuels production, consumption and inventory data are unavailable, significantly lagged, or frequently revised. Production estimates for the months covered by this report are based upon a combination of the most recent available production or trade data, forecast decline rates, project schedules, and adjustments due to maintenance and other reported outages.

Liquid fuels consumption and inventory data for most OECD member countries outside of the United States are based upon published International Energy Agency (IEA) estimates, which are lagged by two to three months and are trended forward using forecast economic growth, weather, and related assumptions. As of this report's release, the most recent available IEA data are for February. Weekly data on U.S. stock changes, refinery activity, and imports together with estimates of primary liquids production, exports, and product supplied are available through EIA's *Weekly Petroleum Status Report*.

EIA's estimates of liquid fuels consumption for non-OECD countries are primarily based upon estimated changes in economic activity and related assumptions.

In this report, monthly data are presented alongside their year-ago and 2009-2011 averages to provide context regarding how current market conditions compare to recent history.

In contrast to volume data, price data are available on a daily basis and can be considered final. The price data in this report are current as of April 25, 2012. In order to make it more understandable, and to respect contractual restrictions on EIA republication of certain data, most price data are reported using 5-day rolling or monthly averages and some are reported only in the figures.

Liquid Fuels Production during March and April 2012

During March and April, world liquid fuels production averaged an estimated 88.7 million bbl/d, which is 2.6 million bbl/d higher than the 2009-2011 annual average and 2.4 million bbl/day higher than the corresponding months of 2011 **(Table 2)**. About 86 percent of the growth in global liquid fuels production over the past year came from members of OPEC. Compared with the three-year average, production in OPEC countries accounted for about 66 percent of the growth. OPEC members serve as the "swing" producers in the world market, because only OPEC producers possess surplus or "spare" oil production capacity.

In March and April, OPEC crude oil production averaged 30.8 million bbl/d, a four-percent increase compared to its three-year average. OPEC's current production, and its relationship to the historical average, must be considered in the context of market conditions during that period. For example, the global economic downturn in 2009, which sharply reduced demand and demand growth for petroleum products, led some OPEC members to reduce production, with corresponding impacts on their 2009-2011 averages. OPEC members also produced approximately 5.7 million bbl/d of non-crude liquid fuels (e.g., condensates and natural gas plant liquids) during March and April. This non-crude output, which is not covered by OPEC's production quotas, was 9 percent higher than its average annual 2009-2011 level.

Among OPEC members, the biggest increase in crude oil production during March and April, relative to recent averages, took place in the Middle East and Africa **(Table 4)**. Saudi Arabia produced an average of 9.8 million bbl/d of crude oil, about 0.9 million bbl/d higher than the levels of a year ago and 1.0 million bbl/d higher than the previous three-year average. Libyan March and April average crude oil production was estimated to be over 1.1 million bbl/d above the average level of March and April 2011, as the country continues to recover from the civil unrest that significantly disrupted its oil exports over the past year. However, Libya's ability to consolidate these gains and sustainably return to pre-disruption production levels is contingent on a favorable security environment, continued political progress, and the return of foreign capital and expertise. Nigeria's crude oil production is estimated to have increased to 2.2 million bbl/d in April, 0.1 million bbl/d above March-April 2011 levels and 0.2 million bbl/d above the three-year average, due to increased volumes from the deepwater Usan field that recently came online and the absence of significant new outages to that country's oil sector. Iraq's production also exceeded its recent averages, as the country continues to recover from decades of sanctions, war, and civil unrest. The commissioning of a new single-point mooring and related infrastructure to facilitate oil exports also has the potential to accommodate increased production in southern Iraq. On the other hand, exports from northern Iraq were curtailed in April due to disputes between the Kurdistan Regional Government and the Iraqi central government and an attack on a crude oil pipeline between Kirkuk and the port of Ceyhan, Turkey.

The biggest recent increases in non-OPEC production have taken place in North America **(Table 3)**. Over the last two months, the broadest measure of liquid fuels production in the United States, which includes production of natural gas liquids, condensates, biofuels, and refinery gains, as well as crude oil, was 10.6 million bbl/d, an increase of 0.7 million bbl/d and 0.9 million bbl/d from its year-ago and 2009-2011 averages, respectively. Tight oil plays were the primary driver of increased U.S. production. Output from the oil sands has been responsible for Canada's increased production in recent years, but technical issues meant that the country's production was only about 0.3 million bbl/d above the 2009-2011 average in March and April. Other non-OPEC countries currently producing at notably higher rates than their three-year averages include Brazil, China and Colombia.

Unplanned outages to non-OPEC production were over 1.2 million bbl/d in March and are estimated to remain at an elevated level in April (**Figure 1**). In Sudan and South Sudan, over 0.3 million bbl/d of oil production remained offline in March as an unresolved dispute between Sudan and the newly independent South Sudan over pipeline transit fees and other issues caused the latter to shut in all of its production around the end of January. The situation deteriorated further in April as intensified military clashes in the poorly-defined border area, including around the Heglig oil field and other oil installations, shut in roughly half of Sudan's remaining production of 0.1 million bbl/d. Canada's production capacity was curtailed by approximately 0.3 million bbl/d in March as a result of maintenance, most of which was due to be completed in April, on three of Canada's largest oil sands operations. In Yemen and Syria, civil conflict continues to compromise a considerable share of each country's oil output. Technical issues persist in the North Sea, including unplanned maintenance at Norway's Valhall platform and shut-in production at the United Kingdom's Elgin platform due to a gas leak at the end of March. Ongoing production problems at the Buzzard Field were exacerbated in late April, as repairs related to a platform fire halted its entire output of 0.2 million bbl/d for at least a few days. Other notable outages include

shut-in production in both Brazil and China due to leaks at fields operated by international oil companies and short-lived disruptions to Australian production due to cyclones.

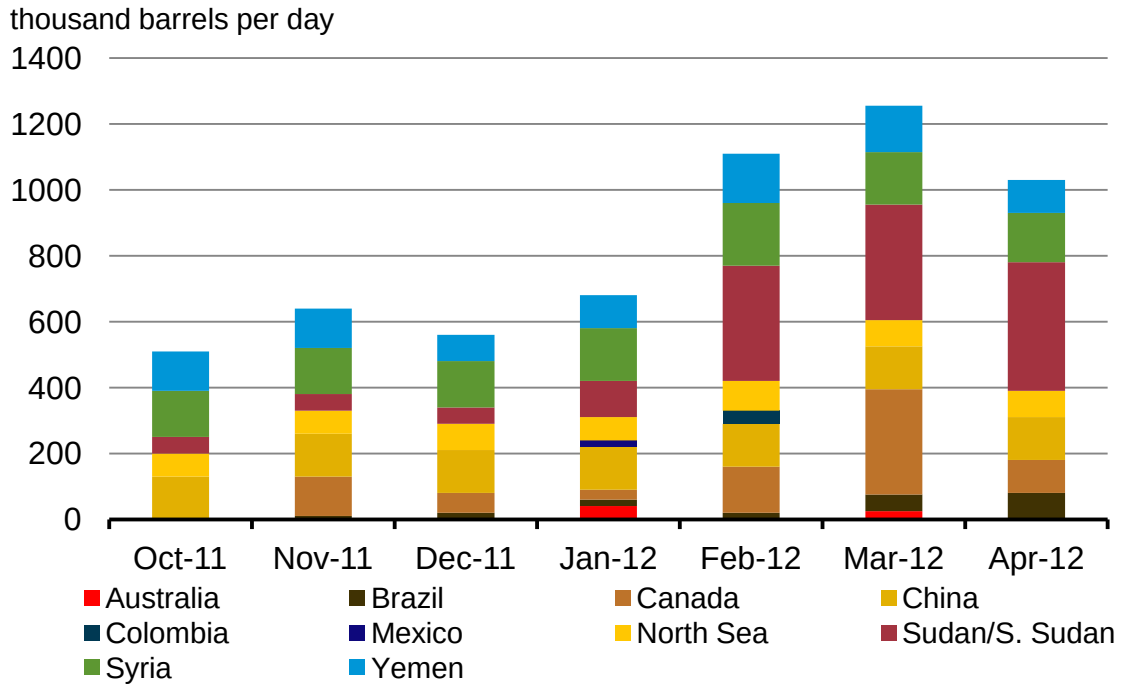
Table 2. International Liquid Fuels Production, Consumption, and Inventory Estimates

Item	March 2012	April 2012	Mar. 2012 - Apr. 2012 Average	Mar. 2011 - Apr. 2011 Average	2009 - 2011 Average
Production (million barrels per day) (a)					
OECD	22.3	22.5	22.4	21.5	21.3
U.S. (50 States)	10.6	10.6	10.6	9.9	9.6
Canada	3.6	3.8	3.7	3.6	3.5
Mexico	3.0	3.0	3.0	3.0	3.0
North Sea (b)	3.6	3.6	3.6	3.5	3.7
Other OECD	1.5	1.5	1.5	1.5	1.5
Non-OECD	66.2	66.4	66.3	64.7	64.8
OPEC	36.3	36.6	36.5	34.3	34.8
Crude Oil Portion	30.7	30.9	30.8	28.9	29.6
Other Liquids	5.6	5.7	5.7	5.4	5.2
Former Soviet Union	13.1	13.1	13.1	13.3	13.1
China	4.3	4.4	4.3	4.3	4.2
Other Non-OECD	12.4	12.4	12.4	12.7	12.7
Total World Production	88.5	88.9	88.7	86.2	86.1
Non-OPEC Production	52.2	52.3	52.2	51.9	51.4
Consumption (million barrels per day) (a)					
OECD	45.3	44.4	44.8	45.2	45.8
U.S. (50 States)	18.3	18.8	18.5	18.9	18.9
U.S. territories	0.3	0.3	0.3	0.3	0.3
Canada	2.2	2.1	2.1	2.2	2.2
Europe	13.9	13.5	13.7	14.1	14.5
Japan	5.0	4.5	4.8	4.3	4.4
Other OECD	5.6	5.2	5.4	5.4	5.4
Non-OECD	43.1	43.6	43.3	42.1	40.9
Former Soviet Union	4.8	4.8	4.8	4.6	4.5
Europe	0.7	0.7	0.7	0.7	0.7
China	10.1	10.1	10.1	9.9	9.2
Other Asia	10.4	10.7	10.6	10.3	9.8
Other Non-OECD	17.0	17.4	17.2	16.5	16.6
Total World Consumption	88.4	88.0	88.2	87.3	86.6
Inventory Net Withdrawals (million barrels per day)					
U.S. (50 States)	-0.3	0.0	-0.2	0.0	0.0
Other OECD	0.1	-0.3	-0.1	0.0	0.1
Other Stock Draws and Balance	0.1	-0.6	-0.2	1.1	0.4
Total Stock Draw	-0.1	-0.9	-0.5	1.0	0.5
End-of-period Inventories (million barrels)					

U.S. Commercial Inventory	1,080	1,079	1,079	1,046	--
OECD Commercial Inventory	2,619	2,628	2,624	2,636	--

OECD = Organization for Economic Cooperation and Development: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, South Korea, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. Monthly OECD supply and consumption does not yet include Chile, Estonia, Israel, or Slovenia.
OPEC = Organization of the Petroleum Exporting Countries: Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela.
Former Soviet Union = Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.
(a) Supply includes production of crude oil (including lease condensates), natural gas plant liquids, biofuels, other liquids, and refinery processing gains.
(b) Includes offshore supply from Denmark, Germany, the Netherlands, Norway, and the United Kingdom.
(c) Consumption of petroleum by the OECD countries is synonymous with " products supplied," defined in the glossary of the EIA Petroleum Supply Monthly, DOE/EIA-0109. Consumption of petroleum by the non-OECD countries is "apparent consumption," which includes internal consumption, refinery fuel and loss, and bunkering.
Source: U.S. Energy Information Administration

Figure 1. Estimated Unplanned Production Disruptions Among non-OPEC Producers, October 2011 - April 2012



Source: U.S. Energy Information Administration

Liquid Fuels Consumption during March and April 2012

Due to time lags in the collection of information, nearly all of the petroleum and petroleum product production, consumption, and inventory change volumes presented in this report are estimates rather than actual data. Over the last two months, EIA estimates that global liquid fuels consumption averaged 88.2 million bbl/d **(Table 2)**, which was 0.9 million bbl/d higher than the year-ago level and 1.6 million bbl/d higher than the 2009-2011 average. Since 2009, non-OECD countries accounted for most of world's consumption growth, due to a combination of rapid economic growth and other factors.

Estimated liquid fuels consumption in non-OECD countries is higher than its year-ago and three-year averages. China's liquid fuels consumption is estimated to be 10.1 million bbl/d, compared to an estimated March-April 2011 average of 9.9 million bbl/d and a three-year average of 9.2 million bbl/d. China's oil demand growth hinges on several factors, including economic and industrial growth, refining capacity expansion, and changes in crude oil and oil products inventories. Recent indicators reflect that China's gross domestic product growth and industrial production moderated in the first quarter of 2012, and the production manufacturing index (PMI) for March fell to the lowest level in 5 months. On the other hand, crude imports remained high through March, and crude oil refining capacity continued to expand.

Average OECD oil consumption for March and April was approximately 0.4 million bbl/d lower than year-ago levels and about 0.9 million bbl/d lower than the three-year average. March and April consumption figures should be considered in light of the seasonality of fuel consumption. Seasonality refers to the fact that consumption normally rises in the Northern Hemisphere winter due to higher heating oil consumption in OECD countries, as well as in the summer because of the U.S. driving season and increased oil use to fuel electricity generation in the Middle East. Japan has had a significant increase in liquid fuel consumption due to a greater reliance on oil for electricity production and reconstruction needs in the wake of the 2011 earthquake and tsunami.

In contrast to the situation in January and February, mild weather has kept European heating oil demand relatively low in March and April. Temperatures moderated from the February cold spell, with March recording temperatures that were warmer than average. Spring is normally the period when inventories are rebuilt, but this general seasonal effect has also been moderated in 2012 as fuel prices remained high, reflecting global crude oil prices. As a result, the demand for heating oil to replenish the winter stock drawdown is being deferred, which will influence demand in the future.

World economic growth slowed during the latter part of 2011, primarily due to a sharp slowdown in Western Europe. During the fourth quarter of 2011, world economic growth is estimated to have been 2.6 percent, compared with 3.0 percent during the previous quarter (all growth rates weighted at market exchange rates). Western Europe experienced an estimated 0.8 percent growth in fourth quarter 2011, 0.6 percentage points below its third quarter growth of 1.4 percent. The first quarter of 2012 showed continued deceleration of world economic growth, at 2.4 percent, with Western Europe's growth at -0.1 percent. Continued negative European growth, unfavorable business outlook data and political problems within some European governments may be contributing factors to the decline in Brent prices over the last few weeks. Except for the United States, most major countries' expected

growth during the first quarter 2012 mirrored the world's slowing pattern of growth. China, Japan, Brazil, India, and Indonesia experienced a sharp deceleration in export growth during the last quarter of 2011.

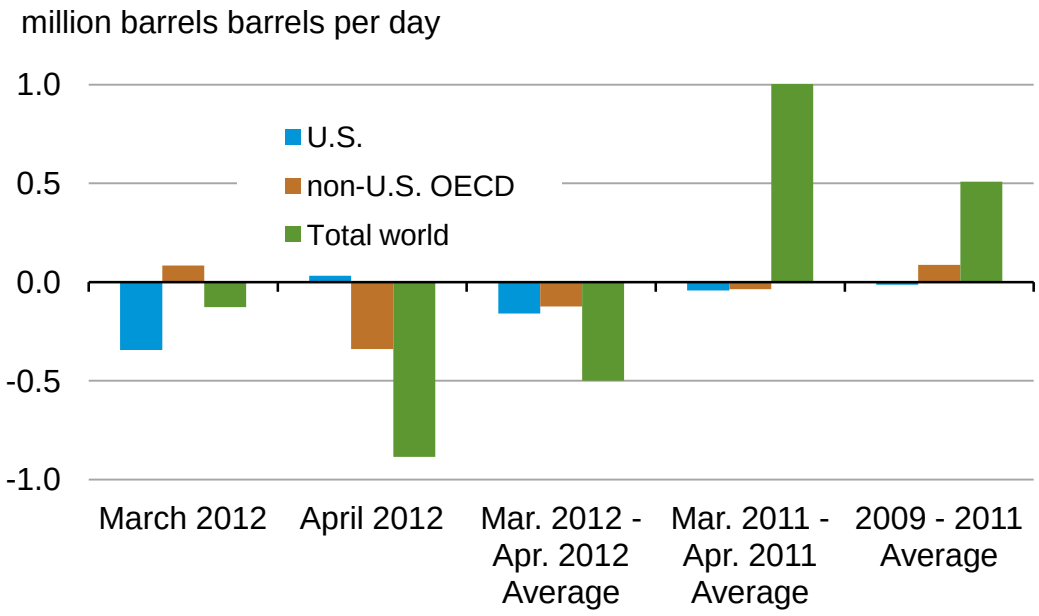
Inventory Net Withdrawals

Commercial oil inventories enable world liquids markets to ameliorate temporary imbalances between supply and demand. Inventories constitute the first line of defense against a supply disruption, which makes inventory change an important metric in assessing the tightness of world oil markets. As such, inventory level and change estimations serve as a balancing factor between supply and demand.

Inventories in the United States were estimated to have risen by 0.3 million bbl/d in March 2012 and to have remained relatively flat in April 2012 **(Table 2)**. EIA estimates that other OECD commercial liquid fuels inventories increased by an average of 0.1 million bbl/d during March and April 2012. Typically, inventories in OECD countries are withdrawn in the winter months (November-March) to meet seasonal increases in oil demand.

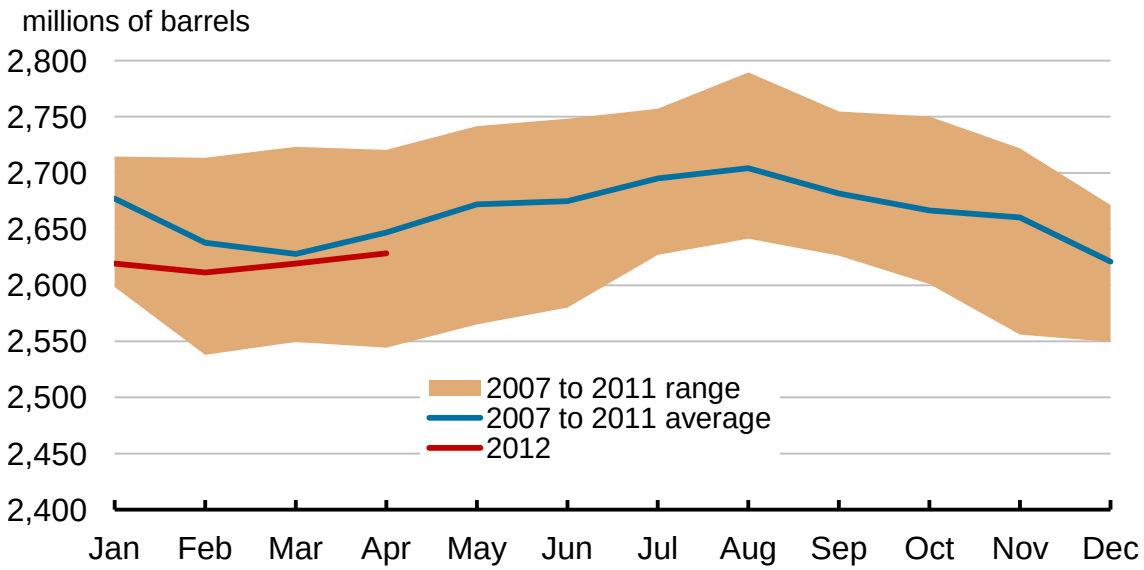
EIA's estimate of global inventories, which include implied non-OECD stocks and a balancing item, built by 0.1 million and 0.9 million bbl/d in March and April 2012, respectively. In contrast, global stock levels decreased by an estimated 1.0 million bbl/d over the same time period in 2011. Reported impediments to Iranian oil exports during March and April 2012 suggests Iranian crude oil exports may now be less than the difference between Iran's estimated liquids production and domestic consumption. There is emerging evidence that the difference between Iranian production and consumption which is not exported is being accumulated, perhaps involuntarily, as on-land and "on the water" oil inventories.

Figure 2. Global Total Liquids Inventories Net Withdrawals



Source: U.S. Energy Information Administration

Figure 3. OECD Total Liquid Fuels Inventories



Source: U.S. Energy Information Administration

Table 3. Non-OPEC Liquid Fuels Supply Estimates

Item (million barrels per day)	**March 2012**	**April 2012**	**Mar. 2012 - Apr. 2012 Average**	**Mar. 2011 - Apr. 2011 Average**	**2009 - 2011 Average**
North America	17.2	17.3	17.3	16.5	16.1
Canada	3.6	3.8	3.7	3.6	3.5
Mexico	3.0	3.0	3.0	3.0	3.0
United States	10.6	10.6	10.6	9.9	9.6
Central and South America	5.0	5.0	5.0	4.8	4.7
Argentina	0.8	0.8	0.8	0.7	0.8
Brazil	2.8	2.8	2.8	2.7	2.7
Colombia	1.0	1.0	1.0	0.9	0.8
Other Central and South America	0.4	0.4	0.4	0.5	0.5
Europe	4.5	4.5	4.5	4.5	4.6
Norway	2.1	2.2	2.1	2.1	2.2
United Kingdom (offshore)	1.3	1.2	1.3	1.2	1.3
Other North Sea	0.2	0.2	0.2	0.3	0.3
Former Soviet Union (FSU)	13.1	13.1	13.1	13.3	13.1
Azerbaijan	0.9	0.9	0.9	1.0	1.0
Kazakhstan	1.6	1.6	1.6	1.7	1.6

Russia	10.0	10.0	10.0	10.2	10.1
Turkmenistan	0.2	0.2	0.2	0.2	0.2
Other FSU	0.3	0.3	0.3	0.2	0.2
Middle East	1.3	1.3	1.3	1.5	1.5
Oman	0.9	0.9	0.9	0.9	0.9
Syria	0.2	0.2	0.2	0.4	0.4
Yemen	0.1	0.2	0.2	0.2	0.2
Asia and Oceania	8.8	8.8	8.8	8.7	8.7
Australia	0.5	0.5	0.5	0.5	0.5
China	4.3	4.4	4.3	4.3	4.2
India	0.9	0.9	0.9	1.0	0.9
Indonesia	1.0	1.0	1.0	1.0	1.0
Malaysia	0.7	0.6	0.6	0.6	0.7
Vietnam	0.3	0.4	0.4	0.3	0.3
Africa	2.3	2.2	2.2	2.6	2.6
Egypt	0.7	0.7	0.7	0.7	0.7
Equatorial Guinea	0.3	0.3	0.3	0.3	0.3
Gabon	0.2	0.2	0.2	0.2	0.2
Sudan	0.1	0.1	0.1	0.4	0.5
Total non-OPEC liquids	52.2	52.3	52.2	51.9	51.4
OPEC non-crude liquids	5.6	5.7	5.7	5.4	5.2
Non-OPEC + OPEC non-crude liquids	57.8	58.0	57.9	57.3	56.5

Former Soviet Union = Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.
Sudan production represents total production from both north and south.
OPEC = Organization of the Petroleum Exporting Countries: Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela.
Source: U.S. Energy Information Administration

Table 4. OPEC Crude Oil (Excluding Condensates) and Liquid Fuels Supply Estimates

Item (million barrels per day)	**March 2012**	**April 2012**	**Mar. 2012 - Apr. 2012 Average**	**Mar. 2011 - Apr. 2011 Average**	**2009 - 2011 Average**
Crude Oil					
Algeria	1.3	1.3	1.3	1.3	1.3
Angola	1.7	1.8	1.7	1.7	1.8
Ecuador	0.5	0.5	0.5	0.5	0.5
Iran	3.4	3.3	3.3	3.7	3.7
Iraq	2.7	2.7	2.7	2.5	2.4
Kuwait	2.5	2.5	2.5	2.4	2.4
Libya	1.3	1.4	1.3	0.3	1.3
Nigeria	2.1	2.2	2.1	2.1	2.0
Qatar	0.9	0.9	0.9	0.9	0.8
Saudi Arabia	9.8	9.8	9.8	8.9	8.8
United Arab Emirates	2.5	2.5	2.5	2.5	2.4
Venezuela	2.2	2.2	2.2	2.2	2.2
OPEC Total	30.7	30.9	30.8	28.9	29.6
Other Liquids	5.6	5.7	5.7	5.4	5.2
Total OPEC Supply	36.3	36.6	36.5	34.3	34.8
Crude Oil Production Capacity					
Africa	6.4	6.6	6.5	5.3	6.4
South America	2.7	2.7	2.7	2.7	2.6
Middle East	24.2	24.0	24.1	24.5	24.0
OPEC Total	33.2	33.3	33.3	32.5	33.1
Surplus Crude Oil Production Capacity					
Africa	0.0	0.0	0.0	0.0	0.1
South America	0.0	0.0	0.0	0.0	0.0
Middle East	2.5	2.4	2.5	3.6	3.4
OPEC Total	2.5	2.4	2.5	3.6	3.5

OPEC = Organization of the Petroleum Exporting Countries: Algeria, Angola, Libya, and Nigeria (Africa); Ecuador and Venezuela (South America); Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates (Middle East).

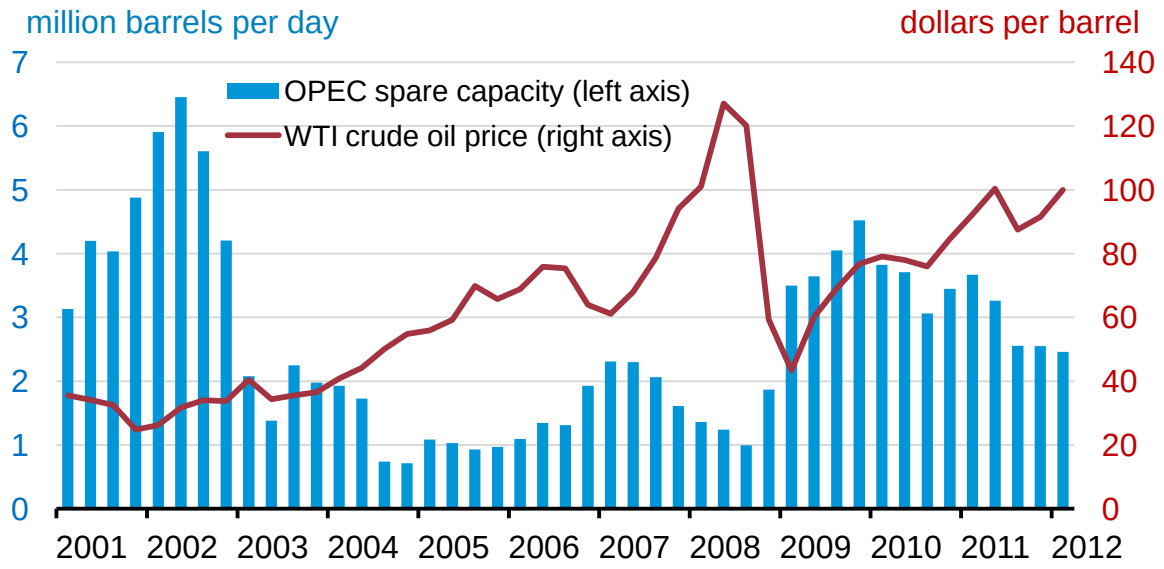
Source: U.S. Energy Information Administration

Spare Crude Oil Production Capacity

EIA defines spare crude oil production capacity as potential oil production that could be brought online within 30 days and sustained for at least 90 days, consistent with sound business practices. This does not include oil production increases that could not be sustained without degrading the future production capacity of a field. Currently, the world's only spare crude oil production capacity lies in the OPEC countries in the Persian Gulf, largely in Saudi Arabia. Spare crude oil production capacity is an important indicator of the market's ability to respond to potential disruptions; consequently, low spare oil production capacity tends to be associated with high oil prices and high oil price volatility.

EIA estimates that spare OPEC oil production capacity averaged 2.5 million bbl/d during March and April, compared with an average of 3.6 million bbl/d in the comparable year-ago period and a 2009-2011 average of 3.5 million bbl/d. Based on EIA estimates, spare production capacity is now less than 3 percent of total world consumption, the lowest proportion since the fourth quarter of 2008. Spare oil production capacity in the first quarter of 2012 was quite modest relative to historical levels **(Figure 4)**. Spare capacity must also be considered in the context of current geopolitical uncertainties, including, but not limited to, the situation in Iran.

Figure 4. World Spare Crude Oil Production Capacity



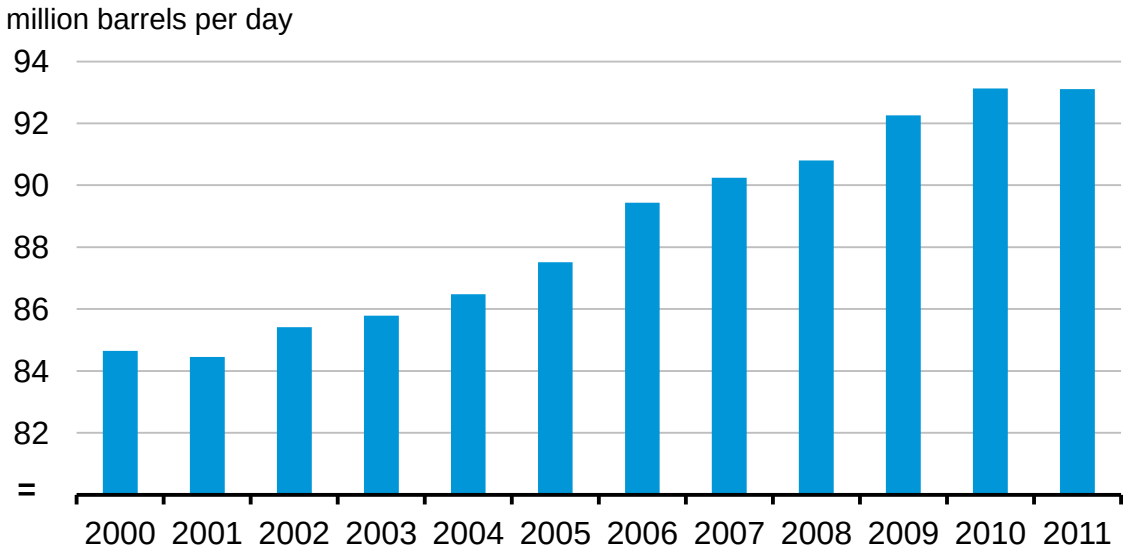
Source: U.S. Energy Information Administration

Refining and Transportation Capacity

Oil refineries and transportation capacity are critical components of the global oil market. When changes in oil supply, demand or loss of capacity cause either refining or transportation capacity to become overloaded, it creates "bottlenecks" that can cause substantial fluctuations in the availability and price of petroleum and petroleum products. With the notable exception of oil pipeline capacity in the U.S. midcontinent, refining and transportation capacity has been adequate and has not caused significant distortions in the availability and price of petroleum and petroleum products during March and April 2012.

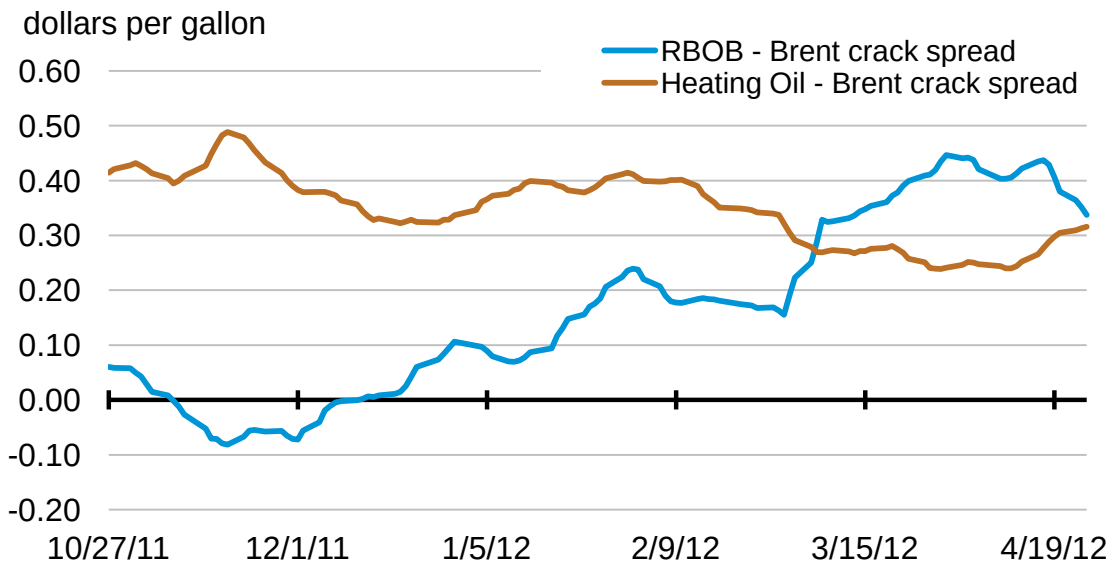
Despite some notable refinery capacity reductions and closures in the United States, the Caribbean, and Europe in 2011, total oil distillation capacity worldwide was essentially unchanged last year **(Figure 5)** as new refining capacity in Asia offset the closures. The difference between the value of refined products and crude oil, or the "crack spread," can be used as an indicator of the adequacy of refining capacity. Two important crack spreads for the U.S. East Coast are RBOB futures and heating oil futures spreads versus Brent **(Figure 6)**. The heating oil crack spread in March and April was $0.27 per gallon **(Table 5)**, slightly below last year's two-month average of $0.30 per gallon. The gasoline crack spread increased from a low in November 2011 to a peak at the end of March 2012 **(Figure 6).** At $0.38 per gallon, the two-month average is 8 cents higher than last year's two-month average of $0.30 per gallon, and almost double the previous three-year average of $0.20 per gallon. Aside from these changes in the RBOB-Brent spread, crude oil and product prices at the key refining centers around the world remain relatively stable, and do not indicate any significant global shortage of refining capacity **(Figures 9, 20, 22, 29)**.

Figure 5. Global Crude Oil Distillation Capacity



Source: Purvin & Gertz.

Figure 6. Front Month Futures Crack Spreads

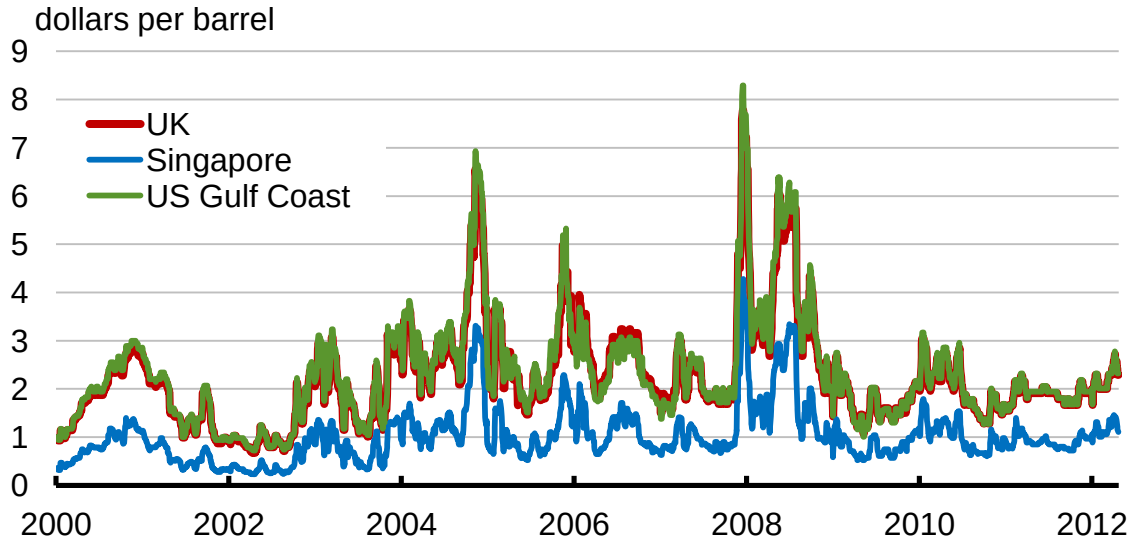


Note: All prices represent rolling 5-day averages.
Source: U.S. Energy Information Administration, based on Chicago Mercantile Exchange (CME) and Intercontinental Exchange (ICE).

Transportation capacity includes crude and petroleum product tankers and barges, pipelines, railroads, and trucks. With respect to their impact on global oil markets, the availability and price of crude oil tankers is the most important for judging the adequacy of transportation capacity.

A common benchmark for marine shipping costs is the shipping rates for very large crude carriers (VLCCs) transiting from the Persian Gulf to key refining centers: United Kingdom, Singapore, and U.S. Gulf Coast **(Figure 7)**. Current rates are at the lows or close to the lows seen since 2004, indicating adequate marine transportation capacity. However, rates did increase slightly in March and the first half of April, but in the cases of shipments from the Persian Gulf to the United Kingdom and U.S. Gulf Coast have since decreased about 10 percent, and in the case of transit to Singapore, have decreased approximately 3 percent.

Figure 7. Very Large Crude Carrier Shipping Rates for Delivery from the Persian Gulf



Source: U.S. Energy Information Administration, based on Bloomberg, L.P.

As part of the EU decision on January 23, 2012, to ban new contracts for Iranian crude oil and wind down purchases under existing contracts by July 1, 2012, the EU also decided to prevent EU-based insurance agencies from making payouts for claims associated with tankers carrying Iranian crude oil. Although the insurance ban does not take effect until July 2012, there is emerging evidence that difficulties in obtaining insurance are already causing some adjustment in oil supply patterns. There are other insurance options for crude oil cargoes outside the United States and the EU, but the EU decision may make it difficult for insurance providers in those other countries to "lay-off" some of the unwanted risks to U.S. and EU counterparties.

Crude Oil and Petroleum Product Prices

Interpreting Price Levels, Volatility, and Spreads

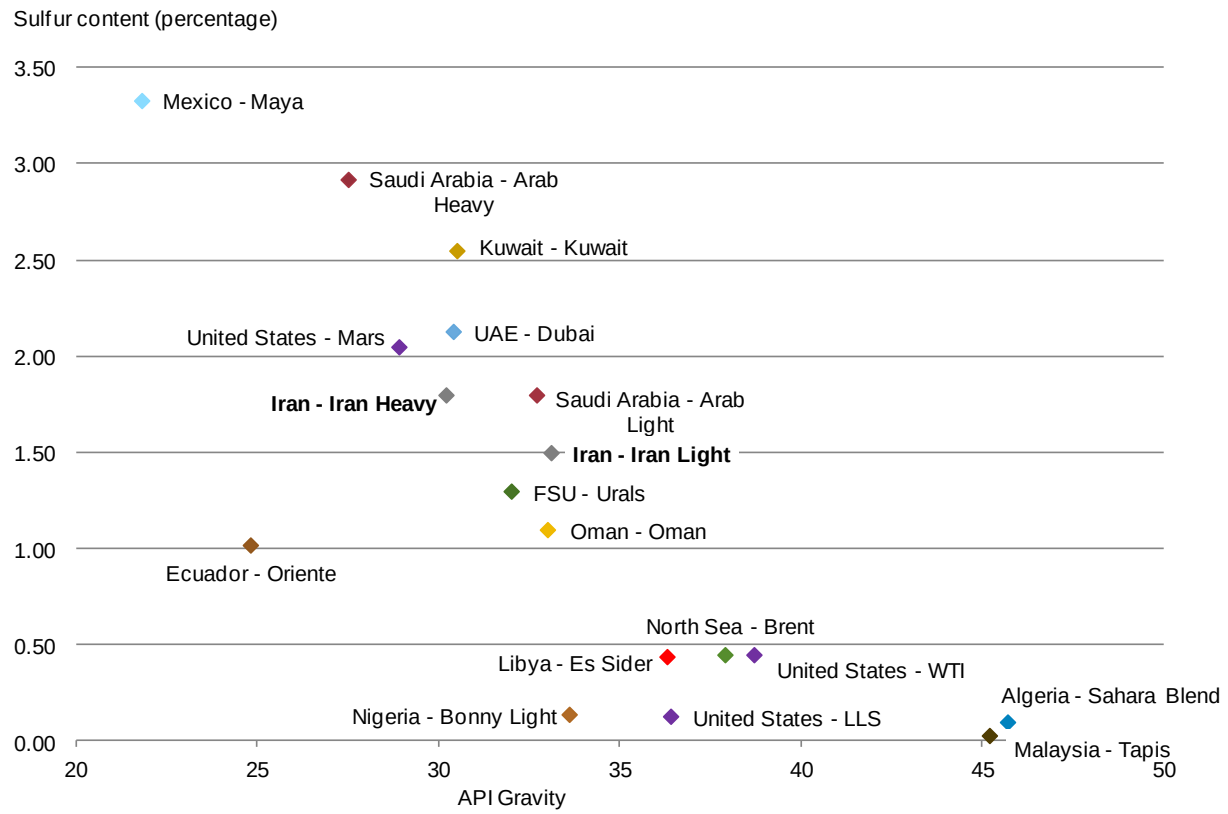
Petroleum and petroleum product prices are indicators of the relative balance of supply and demand. Rising prices suggest that demand is growing more rapidly (or declining at a slower rate) than supply, while falling prices imply that demand is growing less quickly (or falling more rapidly) than supply. Prices also reflect expectations regarding future changes in supply and demand balances.

Crude oil and petroleum products are produced and consumed around the world, with major markets connected by robust transportation links. Prices for crude oil are typically quoted at major trading centers such as Cushing, Oklahoma, the North Sea and the Persian Gulf. Prices for petroleum products such as gasoline, distillate fuels and jet fuel are typically quoted in New York Harbor, the U.S. Gulf Coast, Northwest Europe, and Singapore. Prices for current delivery are referred to as "spot" prices, which are published daily for petroleum and petroleum products at the major trading centers.

In addition, certain crude oils and petroleum products are traded on futures exchanges, where traders buy and sell contracts for future delivery of specific crude oils and petroleum products. Prices are negotiated through a bid and ask system, and therefore reflect news, events, and other information that may affect current or future crude oil and petroleum product supply and demand. This process is referred to as price discovery. The front month futures contract price is an indicator of current market conditions and is usually very close in value to the "spot" price of a specific product in a given trading center. The front month is the active contract with the shortest time to maturity.

Many types of crude oil are produced in the world and are often categorized by quality factors such as density and sulfur content **(Figure 8)**. Crude oils that are light (higher degrees of API gravity) and sweet (low sulfur content) are usually priced higher than heavy, sour crude oils. Gasoline and diesel fuel can usually be produced more easily and cheaply using light, sweet crude oil. The charts in this report show spot prices for seven crude types—three types of crude produced in the Atlantic basin (Brent, Mars, and Maya) and four crudes produced in the Middle East and Pacific basin (Tapis, Dubai, Oriente, and the OPEC basket). In addition, **Table 5** lists front month futures prices for WTI, Brent, and Dubai crude oils.

Figure 8. Density and Sulfur Content of Selected Crude Oils



Source: U.S. Energy Information Administration based on Energy Intelligence Group – International Crude Oil Market Handbook

WTI is an important benchmark crude that is heavily traded on futures exchanges. Over the last 16 months, however, the WTI market has disengaged from other global markets, in large part due to the increasing crude oil flows into Cushing, Oklahoma (the physical delivery point for the NYMEX light, sweet crude oil futures contract) from the northern part of the United States and western Canada exceeding the sum of the regional refining capacity and the pipeline capacity to move the excess crude to refineries in other regions, including the Gulf Coast. For that reason, Brent and other crude oils are currently considered better indicators of global prices for light sweet crude oil.

Spot petroleum product prices are presented for gasoline, distillate and jet fuel in New York Harbor, the U.S. Gulf Coast, Northwest Europe, and Singapore. RBOB is an unfinished gasoline that requires blending with an oxygenate, such as ethanol, before being sold. RBOB (or Eurobob in Europe) is often traded instead of finished motor gasoline that already has been blended with ethanol since oxygenate blending typically takes place at terminals further along the distribution chain. **Table 5** includes front month futures market prices for RBOB and heating oil.

Price differences between types of crude oil or between market locations, and how these differences change over time, provide information on changing market conditions around the world. Monitoring prices and price differentials in several regional markets gives insight into global market conditions. In addition, the difference between the price of the front month and twelfth month futures contracts is one way to measure current market tightness relative to expectations for the coming year. A positive difference, referred to as backwardation, indicates tightness in the current market, while a negative difference, called contango, indicates a looser supply-demand balance and encourages stock building.

Historical volatility is an empirical measure of the magnitude of price movements in a past time period. Implied volatility represents the market's expectation about the magnitude of future price movements and is calculated based on option prices.

The put-call ratio is another measure of market sentiment, which is calculated by dividing the total number of put option contracts by the number of call option contracts. If market participants are concerned about prices rising in the future, they would tend to purchase more call options, which would reduce the put-call ratio. However, one important limitation regarding this data is that most forward transactions take place outside of organized exchanges. On-exchange contract volumes are not necessarily indicative of developments in the broader marketplace.

Additional information can be provided by the volatility skew, which is constructed by graphing the implied volatility against option strike prices. The skew provides an indication of the concerns that market participants have about large upward or downward future price movements.

Data from options trading in futures markets can also be used to calculate the probability that a futures contract will expire above specified price levels. Both the volatility skew and the probability calculations for crude oil presented in this report use data from WTI options trading, which is a much more active market than options trading for Brent. As futures and options contracts get closer to expiration, changes in the probabilities of exceeding different price levels can be dominated by relatively small changes in the time to expiration. In order to avoid this, EIA performs this probability calculation on futures contracts that expire within the next 2 to 5 months at time of publication of this report.

Table 5. Crude Oil and Petroleum Product Price Data

Item	March 2012 Average	April 2012 Average*	Mar. - Apr. 2012 Average*	Mar. - Apr. 2011 Average	2009-2011 Average
Brent Front Month Futures Price ($ per barrel)	124.54	120.54	122.80	118.88	84.64
WTI Front Month Futures Price ($ per barrel)	106.20	103.14	104.87	106.51	78.94
Dubai Front Month Futures Price ($ per barrel)	122.84	117.36	120.45	112.96	82.51
Brent 1st - 12th Month Futures Spread ($ per barrel)	7.15	5.85	6.58	3.33	-3.08
WTI 1st - 12th Month Futures Spread ($ per barrel)	-1.17	-1.60	-1.36	-1.16	-5.39
RBOB Front Month Futures Price ($ per gallon)	3.34	3.26	3.31	3.13	2.21
Heating Oil Front Month Futures Price ($ per gallon)	3.23	3.15	3.19	3.13	2.26
RBOB - Brent Futures Crack Spread ($ per gallon)	0.38	0.39	0.38	0.30	0.20
Heating Oil - Brent Futures Crack Spread ($ per gallon)	0.26	0.28	0.27	0.30	0.24

**Note: April prices include data through market close on April 25, 2012.*
Source: U.S. Energy Information Administration, based on Chicago Mercantile Exchange (CME), Intercontinental Exchange (ICE) and Dubai Mercantile Exchange (DME).

Crude Oil: Price Levels, Volatility, and Spreads - March and April 2012

The Brent crude oil futures prices for the prompt month traded in a narrow range in the month of March and then moved lower in the month of April. The average price for the 5-day period ending April 25 was $118.55 per barrel, a decrease from the$123.56 average for the 5-day period ending February 27. Brent futures in March recorded the highest monthly average price since July of 2008 but declined by about $4 per barrel in April **(Figure 9)**. Brent crude oil futures prices remain $35-$40 per barrel higher than the average from 2009-2011, and are about $4 per barrel higher than in March and April of 2011 **(Table 5)**.

Spot prices for crude oil around the world in March remained at the levels reached towards the end of February and have since drifted lower in April **(Figures 9 and 10)**. Brent, a light sweet crude located in the Atlantic basin, dropped by $5.36 per barrel, one of largest price decreases from March to April. Maya, a heavy sour crude also located in the Atlantic basin, had the smallest drop over the same time period. The spread between these two crudes narrowed by $1.62 per barrel from March to April, indicating that the high demand over the last few months for light sweet crude oil may be easing. Overall, most crude oil spot price differentials did not change very much from March to April, with light sweet crude oil prices weakening slightly more than heavy sour crudes. The one exception to this is the OPEC basket price, which decreased less than most light sweet crude oils from March to April. This implies stronger demand for OPEC crude oil.

Crude oil futures time spreads were lower in the month of April, supporting estimates that crude oil inventories are building and suggesting that crude oil markets may be less tight than earlier this year **(Figure 14)**. The 1st – 12th month contract spread for Brent peaked at $7.94 per barrel for the 5-day period ending March 1 and has decreased to $5.17 per barrel for the five days ending April 25. As the difference between the first and twelfth month contracts decreases (Brent becomes less backwardated), there is less incentive to sell oil out of inventories now and buy them back later. Some of the inventory builds that the market is currently experiencing could be the result of backwardation seen a few months

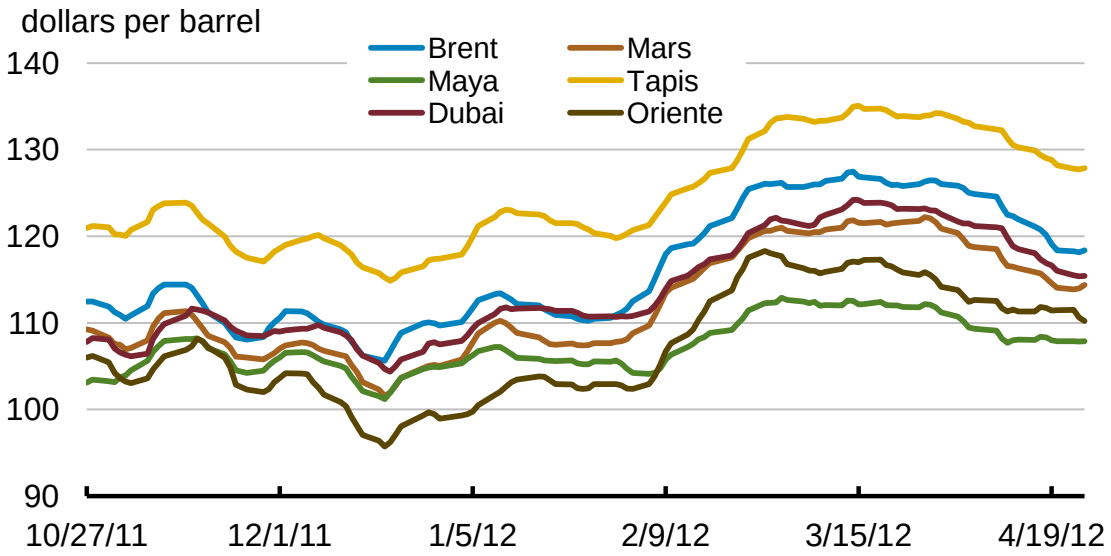
ago; crude oil may have been sold out of inventories at that time, with agreements for it to be bought back now. The WTI future curve was essentially flat in the beginning of March and has since moved into contango as the 1st – 12th month contract spread is -$1.08 per barrel for the 5-day period ending April 25.

Implied volatility decreased in March to its lowest levels since February of 2011, just prior to the unrest in North Africa and the Middle East last spring **(Figure 15)**. Implied volatility levels increased slightly in April. Comparing the 5-day periods ending February 27, 2012 and April 25, 2011, implied volatility declined by 5 percentage points to a level of 24 percent.

The put-call ratio has been relatively constant over the previous two months as traders' appetites for call and put options remain approximately the same **(Figures 17)**. A review of changes in the volatility skew for the September futures contract over the last two months shows that implied volatility has dropped almost equally for out-of-the-money put and call options **(Figure 18)**. Each strike price has experienced a decrease of 2 to 6 percentage points. This reflects a belief that the chance of crude oil prices moving either up or down between now and September has decreased since February 27.

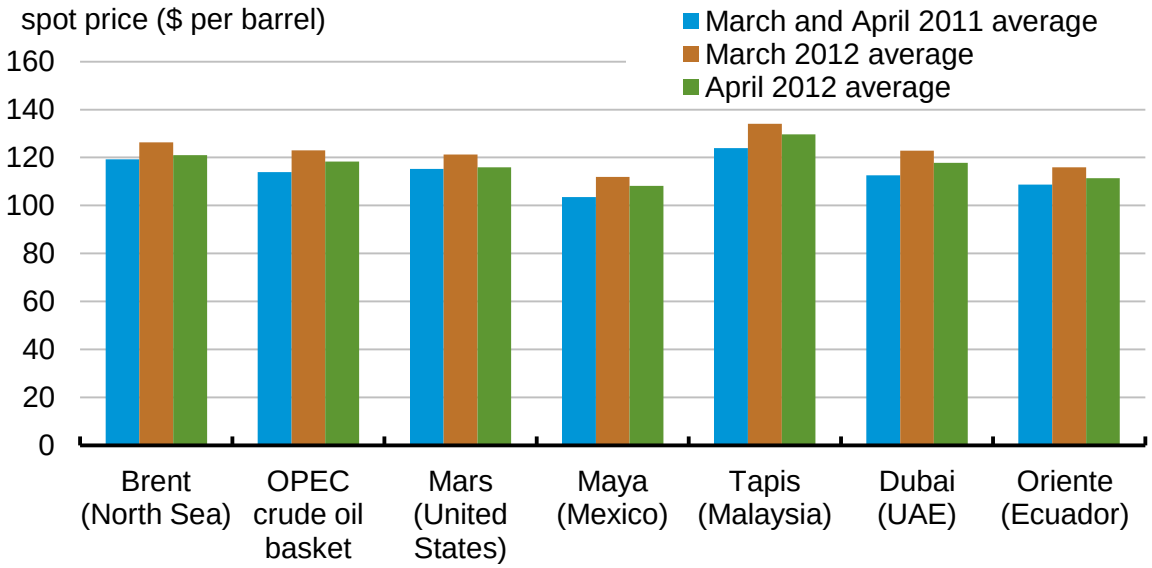
For the five days ending April 25, the average price of the September 2012 WTI crude oil futures contract was $104.53 per barrel and the average price of the September 2012 Brent contract was $117.46 per barrel. The WTI and Brent prices for the 5-day average ending April 25 for the September 2012 contract have decreased by about $4 per barrel and $2.50 per barrel, respectively, since the end of February. Based on implied volatilities calculated from options and futures prices over the 5 days ending April 25, the probability of the September 2012 WTI futures contract expiring above $120 per barrel is 15 percent, a decrease of 13 percentage points from the same calculation made using price data from the 5-day period ending February 27 **(Figure 19)**. Given the higher absolute level of Brent prices relative to WTI prices over the last two months, the probabilities that the September Brent contract will exceed specified dollar thresholds are higher.

Figure 9. Global Crude Oil Spot Prices



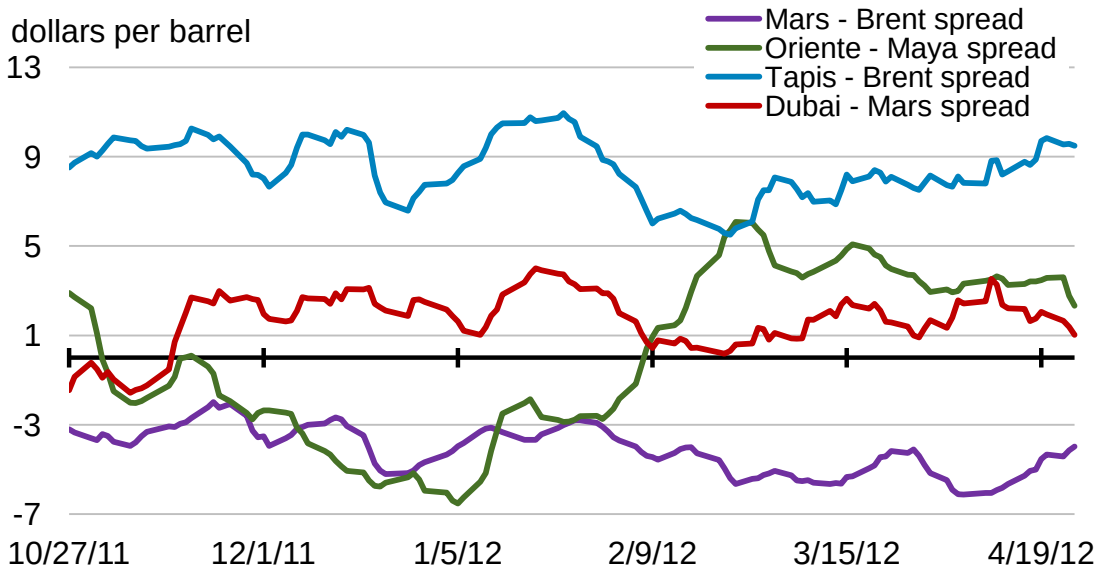
Note: All prices represent rolling 5-day averages.
Source: U.S. Energy Information Administration, based on Bloomberg, L.P.

Figure 10. Global Crude Oil Spot Price Averages



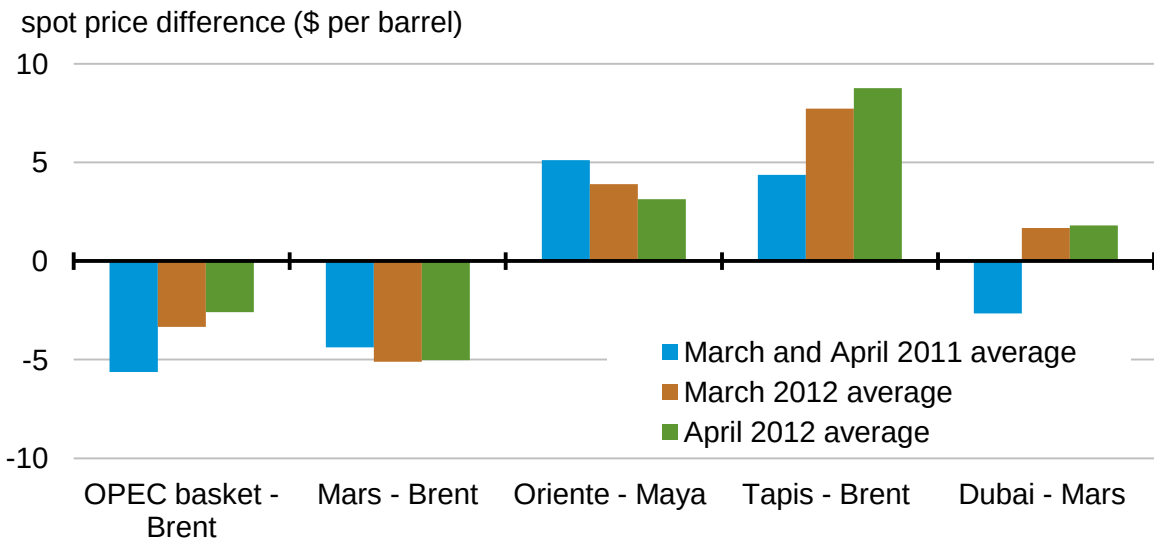
Source: U.S. Energy Information Administration, based on Bloomberg, L.P.

Figure 11. Global Crude Oil Spot Price Differentials



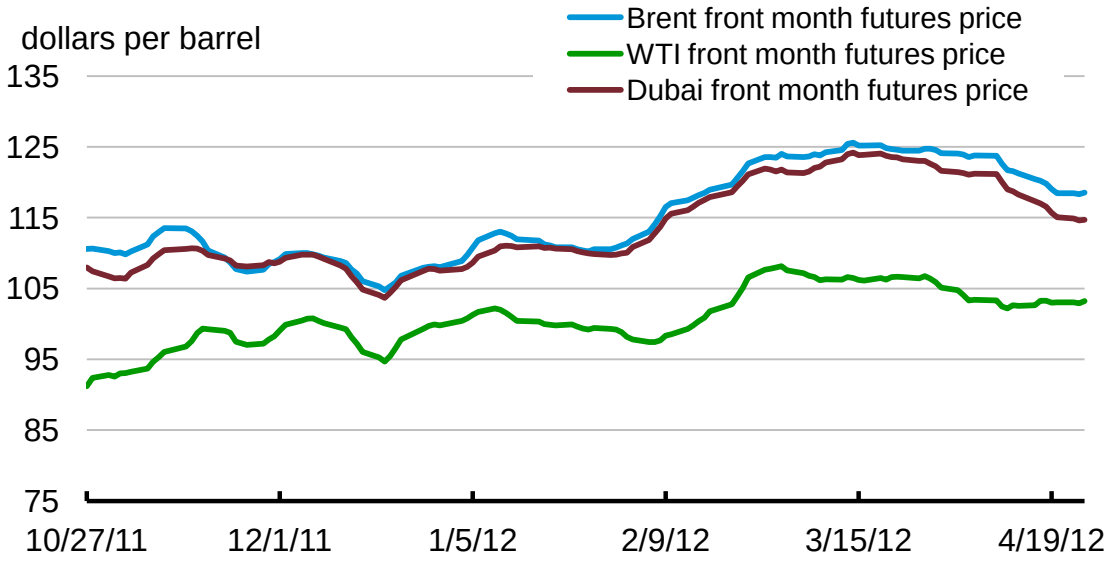
Note: All prices represent rolling 5-day averages.
Source: U.S. Energy Information Administration, based on Bloomberg, L.P.

Figure 12. Global Crude Oil Spot Price Differential Averages



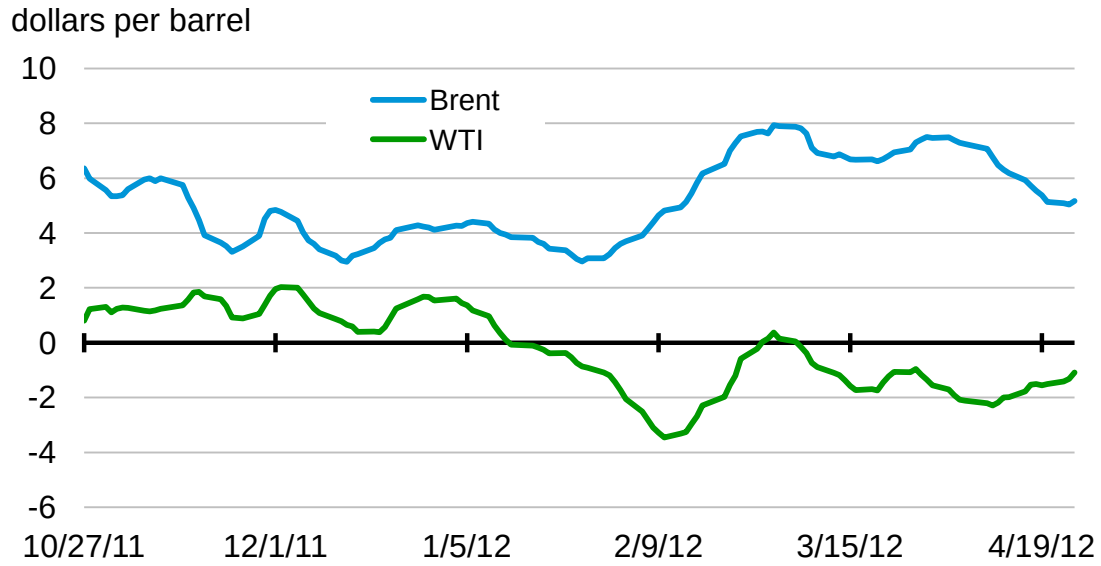
Source: U.S. Energy Information Administration, based on Bloomberg, L.P.

Figure 13. Front Month Crude Oil Futures Prices



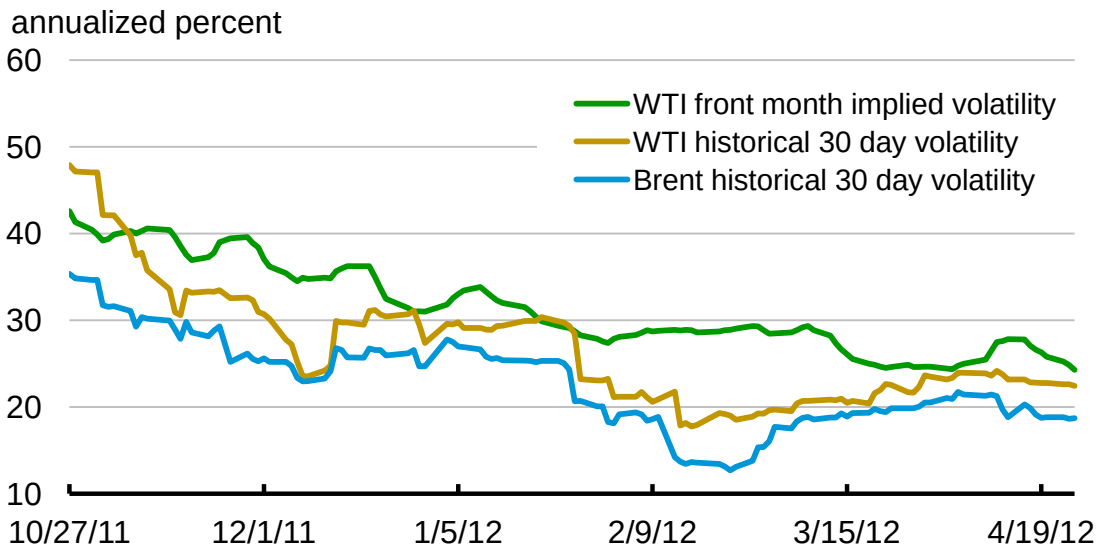
Note: All prices represent rolling 5-day averages.
Source: U.S. Energy Information Administration, based on Chicago Mercantile Exchange (CME), Intercontinental Exchange (ICE) and Dubai Mercantile Exchange (DME).

Figure 14. Crude Oil 1st - 12th Month Futures Price Spread



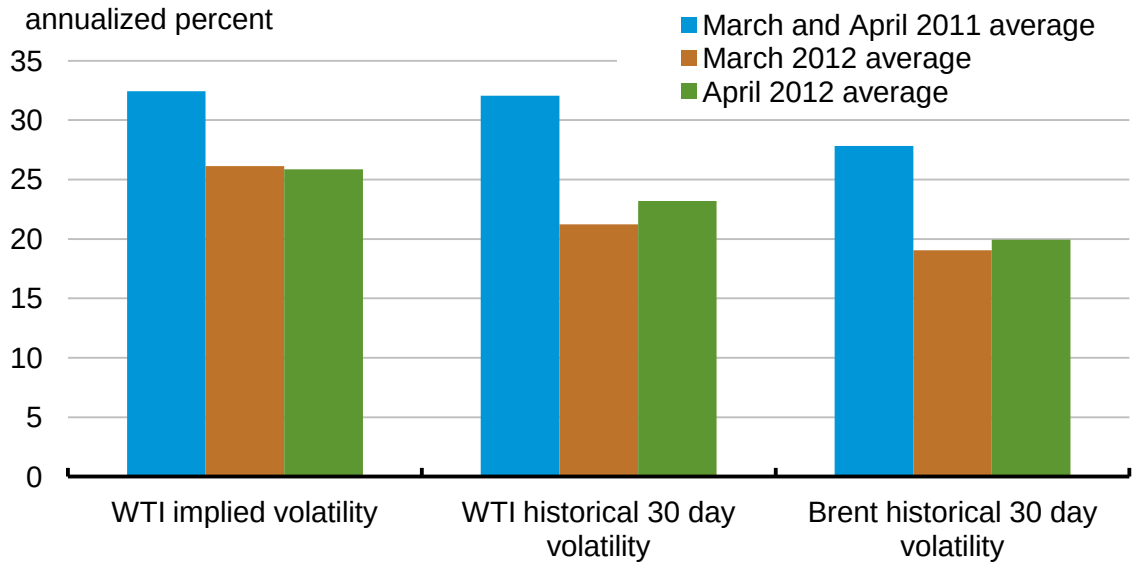
Note: All prices represent rolling 5-day averages.
Source: U.S. Energy Information Administration, based on Chicago Mercantile Exchange (CME) and Intercontinental Exchange (ICE).

Figure 15. Crude Oil Historical and Implied Volatility



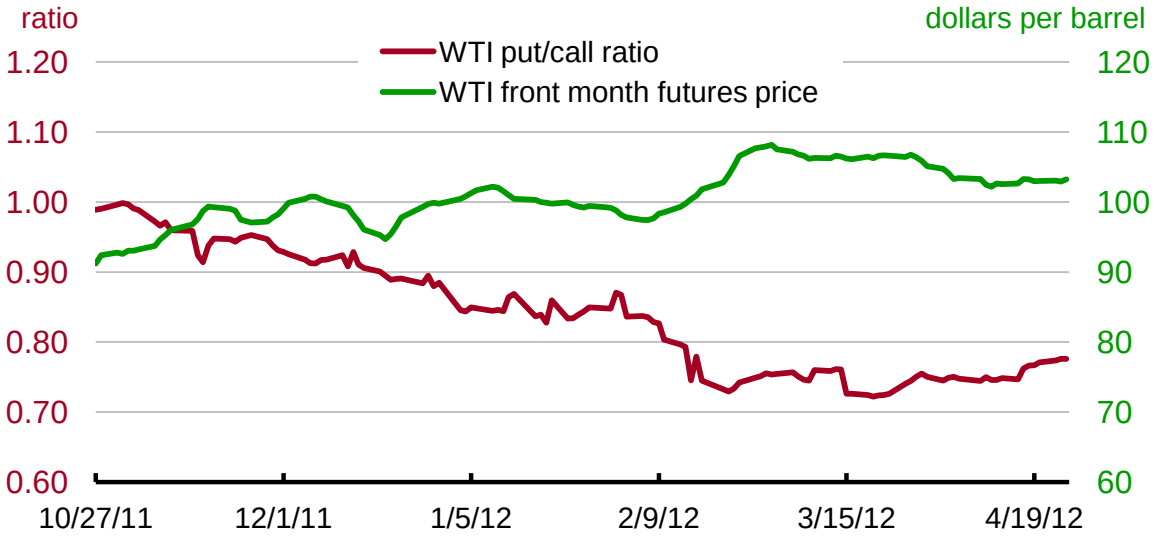
Note: Historical volatility is shown as a 30-day rolling average. Implied volatility is a 5-day rolling average.
Source: U.S. Energy Information Administration, based on Chicago Mercantile Exchange (CME) and Intercontinental Exchange (ICE).

Figure 16. Crude Oil Historical and Implied Volatility Averages



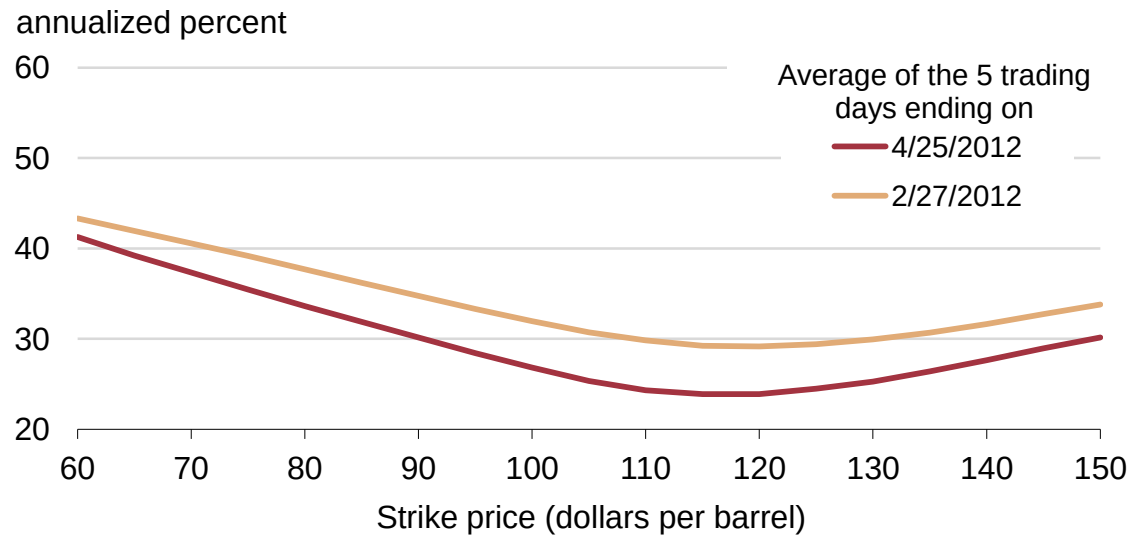
Source: U.S. Energy Information Administration, based on Chicago Mercantile Exchange (CME).

Figure 17. Put/Call Ratio for all Options on WTI Futures Contracts



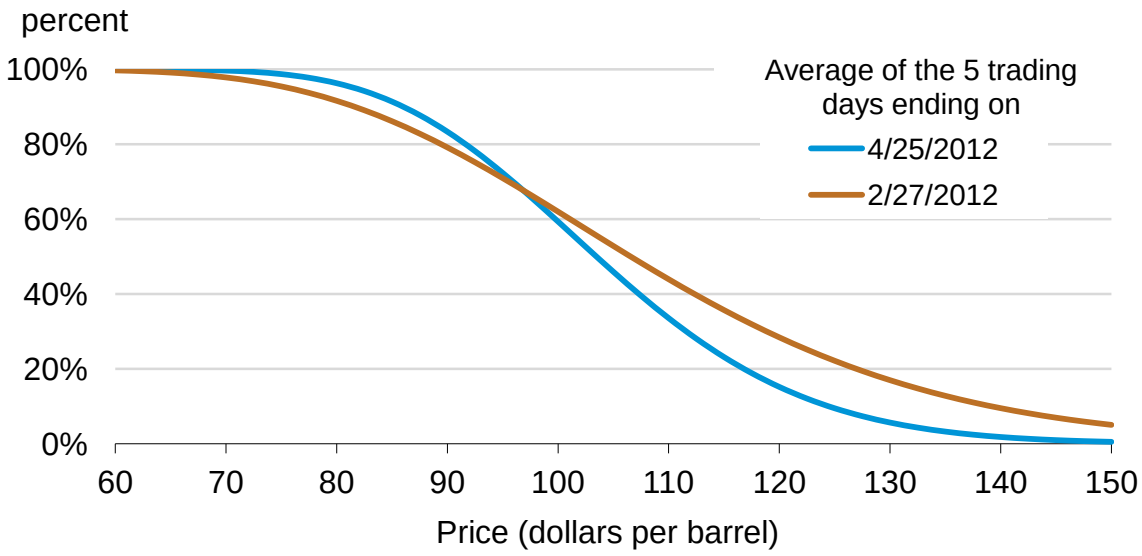
Source: U.S. Energy Information Administration, based on Chicago Mercantile Exchange (CME) and Intercontinental Exchange (ICE).

Figure 18. Volatility Skew for the September 2012 WTI Futures Contract



Note: Historical volatility is shown as a 30-day rolling average. Implied volatility is a 5-day rolling average.
Source: U.S. Energy Information Administration, based on Chicago Mercantile Exchange (CME).

Figure 19. Probability of the September 2012 WTI Contract Expiring Above Different Price Levels



Source: U.S. Energy Information Administration, based on Chicago Mercantile Exchange (CME).

Petroleum Products: Price Levels, Volatility, and Spreads - March and April 2012

Gasoline spot prices in trading centers in the United States and Europe increased in April 2012 by 0-3 percent over March 2012, while prices in Singapore decreased by 2 percent. The March-April 2012

average was 5-10 percent higher than that of the prior year **(Figure 20)**. Gasoline prices in the U.S. Gulf Coast rose sharply in mid-March relative to Northwest Europe and Singapore. Spot prices in Northwest Europe began rising in the last week of March, bringing the differential with the Gulf Coast back into line, but establishing premiums to both New York and Singapore **(Figure 21)**. Prices eased back in the latter half of April, narrowing the differentials among the regional prices.

Distillate spot prices began drifting lower in mid-March. Monthly average prices for April 2012 were about 2 percent lower than March 2012, but the March-April 2012 average was about 1-2 percent higher than the prior-year average **(Figure 22)**. Prices declined more in the United States, resulting in lower differentials with Northwest Europe and Singapore until early April. In the second half of April, declining prices outside the United States narrowed the differentials **(Figure 23)**.

Gasoline front month futures prices rose steadily through the end of March then turned slightly lower **(Figure 24)**. While concerns about weak U.S. gasoline consumption remain, the focus appears to have shifted to concerns about refinery shutdowns in the United States, Europe, and the Caribbean. At the end of March, gasoline crack spreads (the difference between the front month prices of RBOB and Brent) reached the highest level since May 2011, but then declined slightly in April.

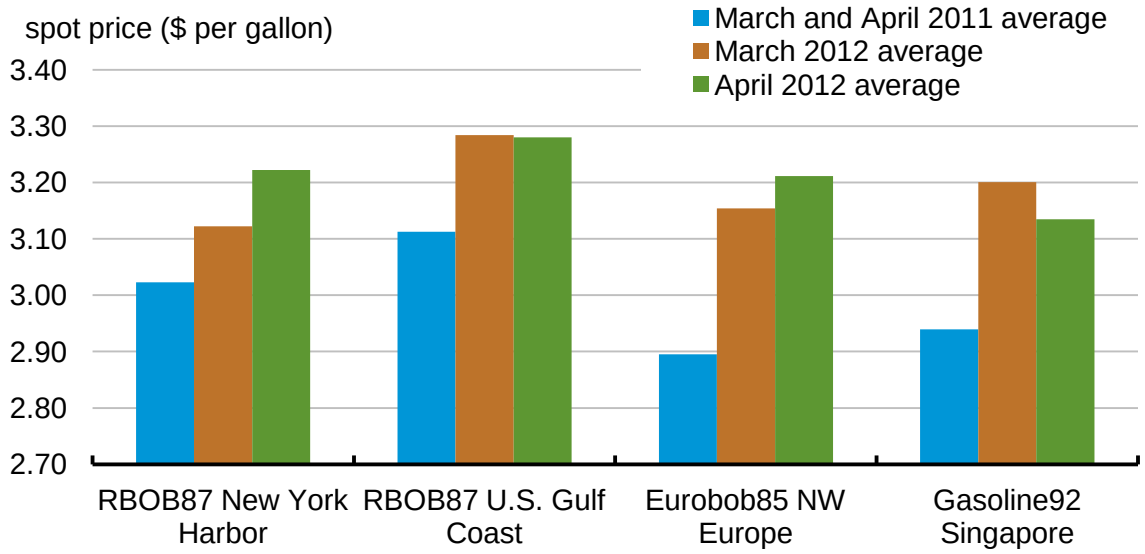
Heating oil front month futures prices have fallen slightly over the past few weeks. Global distillate demand remains strong but a warmer-than-normal winter weakened heating oil consumption in the United States. Distillate crack spreads declined in March before stabilizing in April.

Implied volatilities for the RBOB and heating oil contracts were several percentage points lower in March and April than the prior-year averages **(Figure 25)**. RBOB historical volatility was nearly the same in March 2012 as the prior-year average, while heating oil historical volatility was much lower in March and April 2012. RBOB implied volatility began rising in late March after trending down through most of February and March **(Figure 26).** Heating oil implied volatility started to increase slowly after falling in early March **(Figure 27)**.

The average price of the September 2012 RBOB futures contract for the 5-day period ending April 25 was $3.00 per gallon, a decrease of 11 cents per gallon since February 27. The implied volatility of the September 2012 RBOB futures contract for the 5-day period ending April 25 was 3 percentage points below the implied volatility for same contract calculated for the 5-day period ending February 27. The higher price offset the lower implied volatility and shorter time to expiration, resulting in only a small change in the market expectation for the September contract to expire at higher prices. The probability of the September 2012 RBOB futures contract expiring above $3.35 per gallon (comparable to a $4.00 per gallon national average retail price for regular grade gasoline) is now 21 percent, an 11-percentage-point decrease from February 27 **(Figure 28)**.

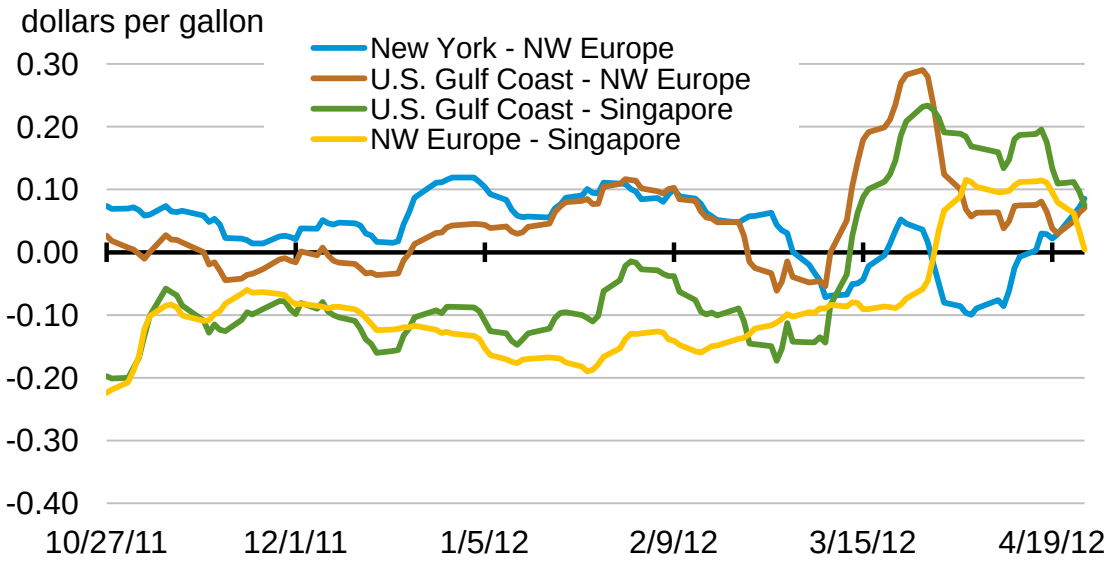
Jet fuel spot prices moved in a narrow trading range in March and April 2012, and were only slightly different from the prior-year average **(Figure 29)**. Regional differentials also changed little over this period **(Figure 30)**.

Figure 20. Global Gasoline Spot Price Averages



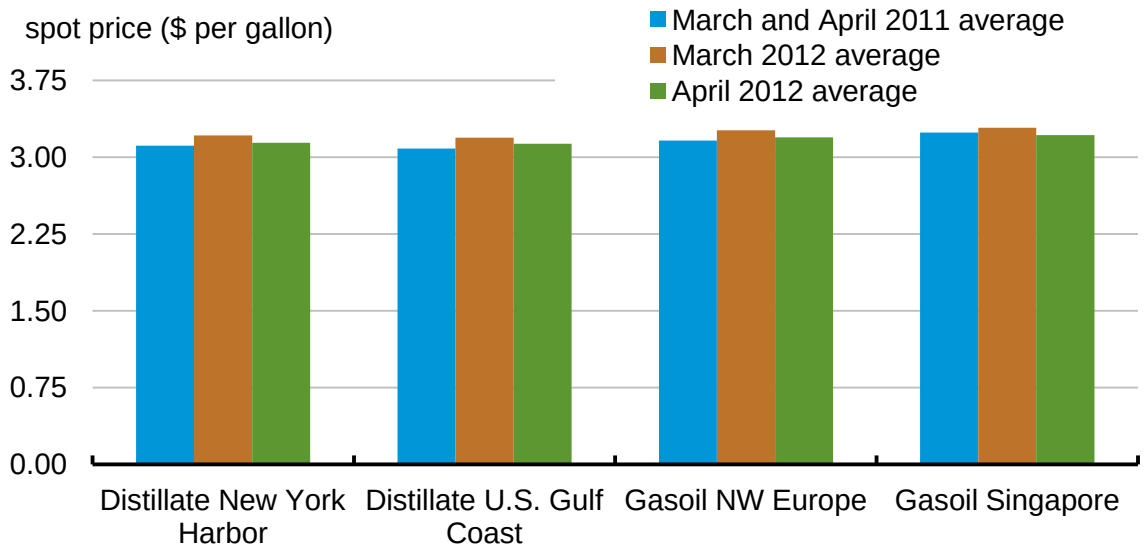
Source: U.S. Energy Information Administration, based on Bloomberg, L.P.

Figure 21. Global Gasoline Spot Price Differentials



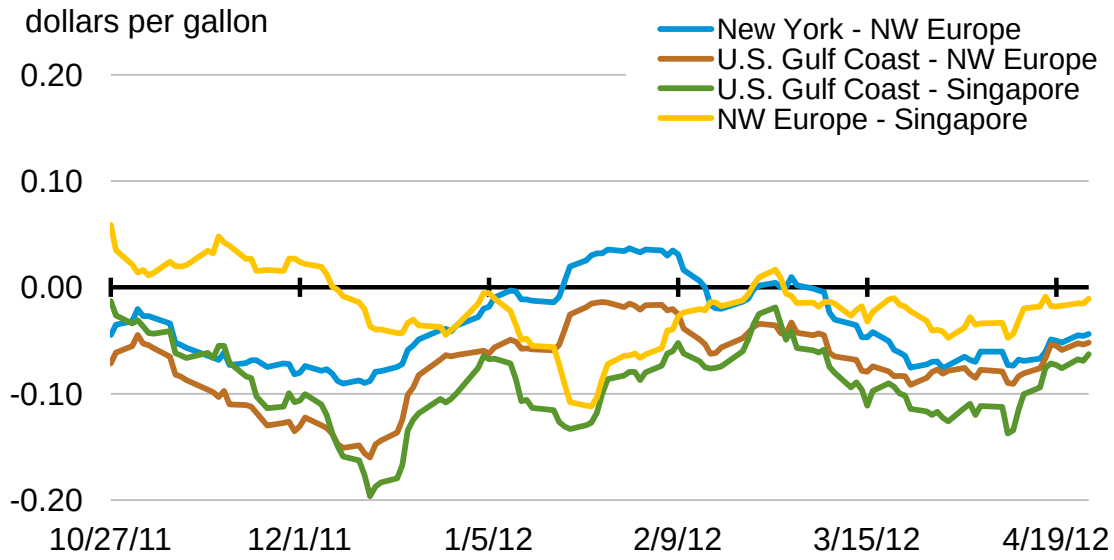
Note: All prices represent rolling 5-day averages.
Source: U.S. Energy Information Administration, based on Bloomberg, L.P.

Figure 22. Global Distillate Spot Price Averages



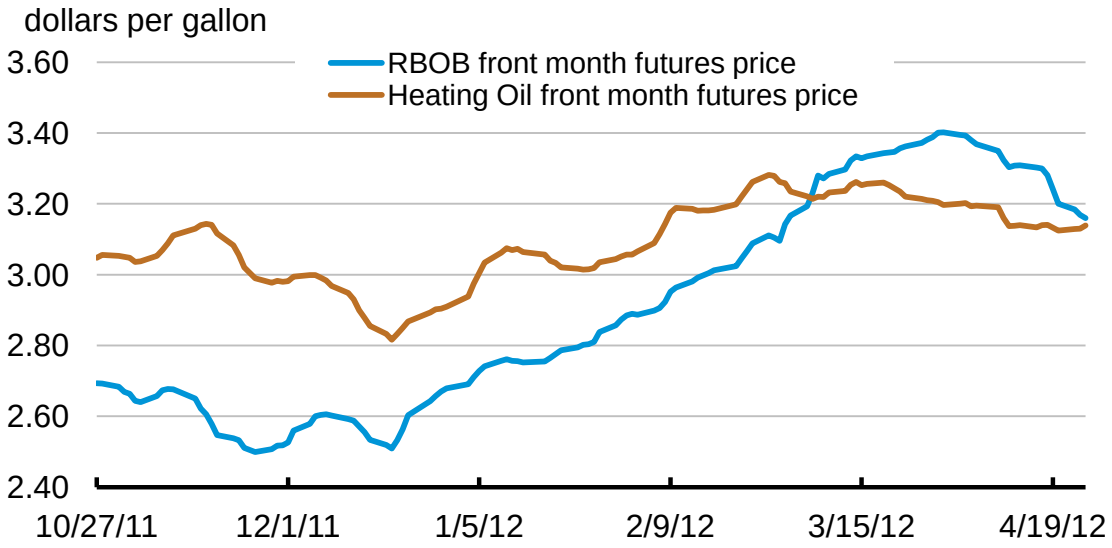
Source: U.S. Energy Information Administration, based on Bloomberg, L.P.

Figure 23. Global Distillate Spot Price Differentials



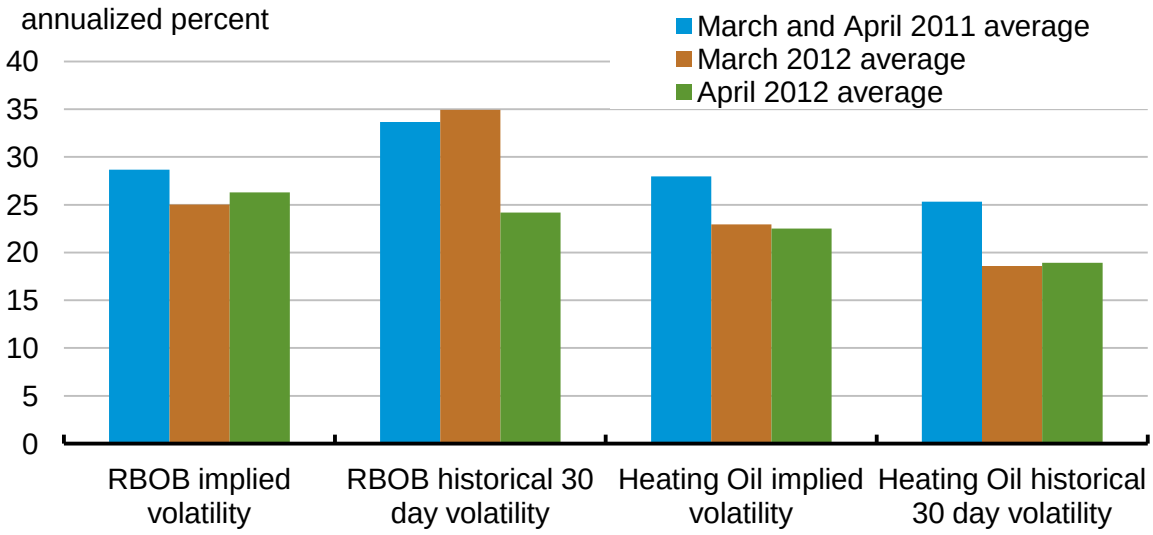
Note: All prices represent rolling 5-day averages.
Source: U.S. Energy Information Administration, based on Bloomberg, L.P.

Figure 24. Front Month RBOB Gasoline and Heating Oil Futures Prices



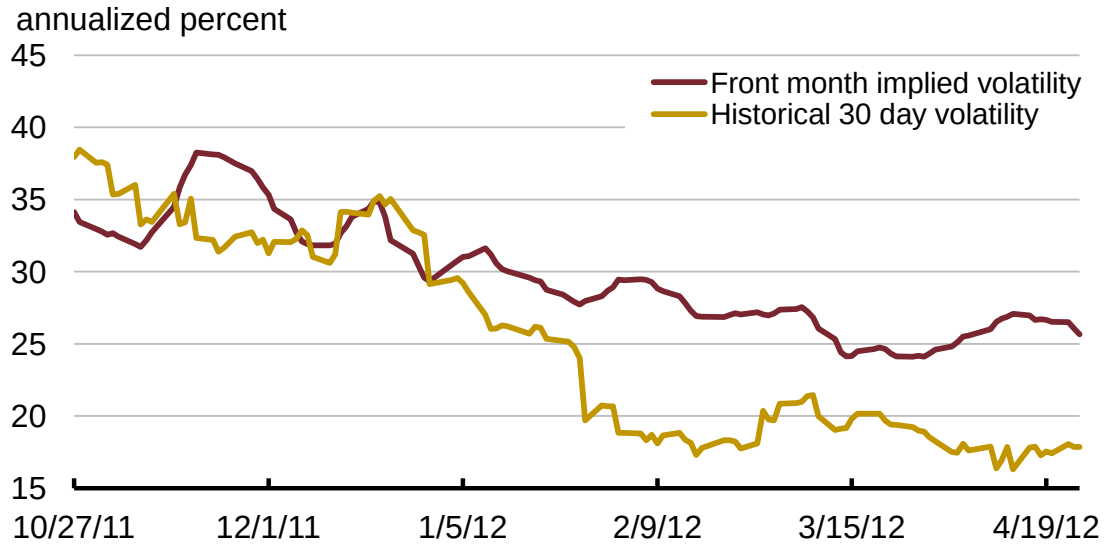
Note: All prices represent rolling 5-day averages.
Source: U.S. Energy Information Administration, based on Chicago Mercantile Exchange (CME).

Figure 25. Front Month Futures Volatility



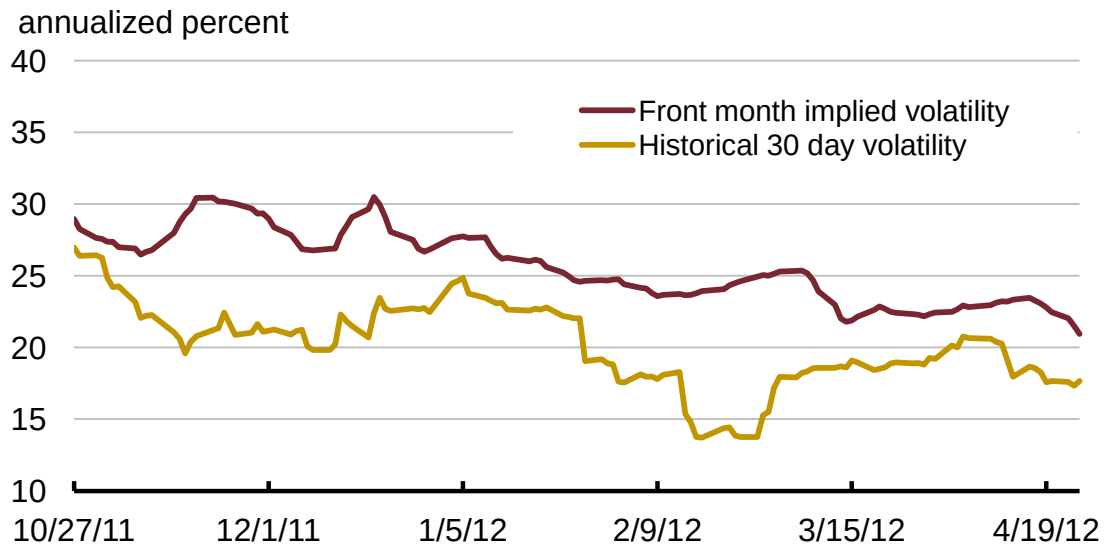
Source: U.S. Energy Information Administration, based on Chicago Mercantile Exchange (CME).

Figure 26. RBOB Gasoline Historical and Implied Volatility



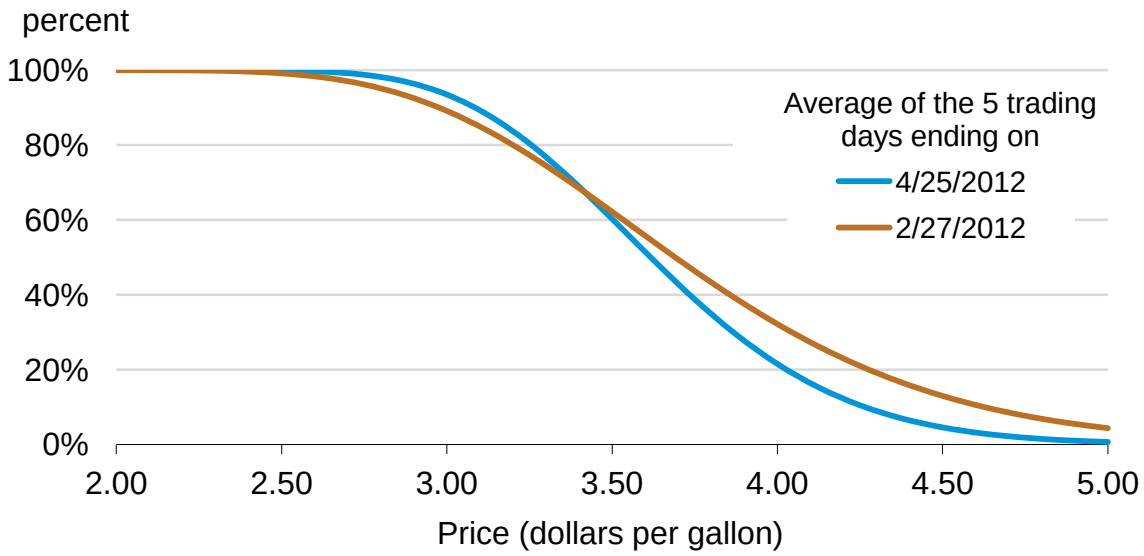
Note: Historical volatility is shown as a 30-day rolling average. Implied volatility is a 5-day rolling average.
Source: U.S. Energy Information Administration, based on Chicago Mercantile Exchange (CME).

Figure 27. Heating Oil Historical and Implied Volatility



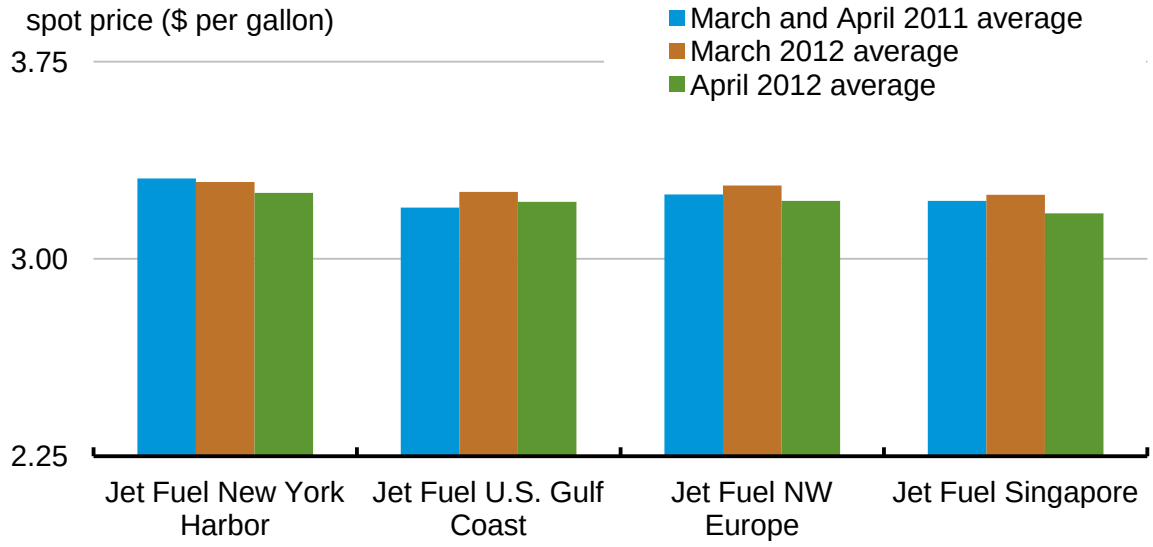
Note: Historical volatility is shown as a 30-day rolling average. Implied volatility is a 5-day rolling average.
Source: U.S. Energy Information Administration, based on Chicago Mercantile Exchange (CME).

Figure 28. Probability of September 2012 Retail Gasoline Exceeding Different Price Levels at Expiration



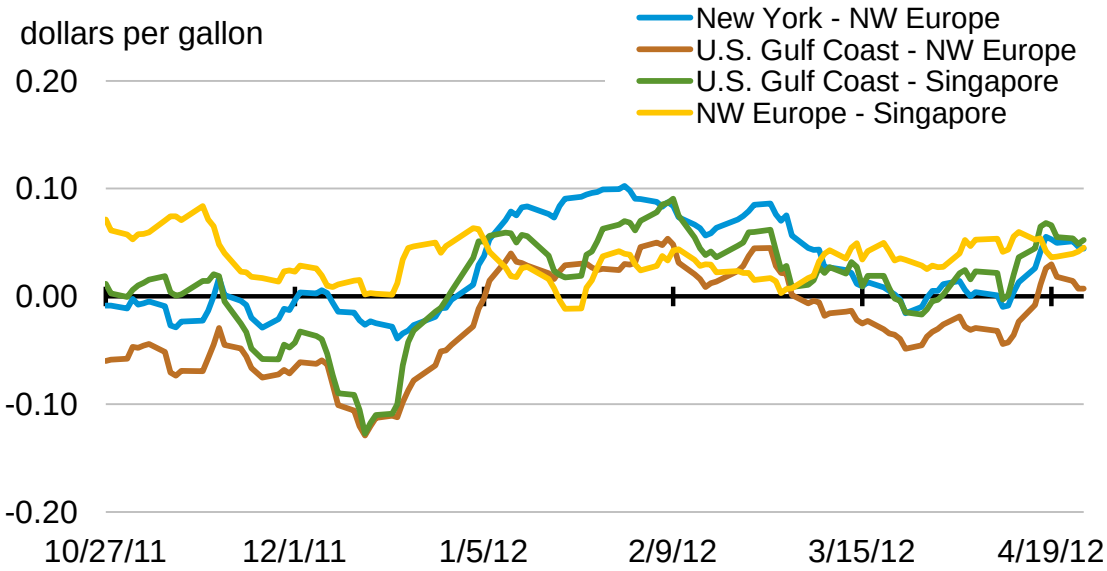
Source: U.S. Energy Information Administration, based on Chicago Mercantile Exchange (CME).

Figure 29. Global Jet Fuel Spot Price Averages



Source: U.S. Energy Information Administration, based on Bloomberg, L.P.

Figure 30. Global Jet Fuel Spot Price Differentials



Note: All prices represent rolling 5-day averages.
Source: U.S. Energy Information Administration, based on Bloomberg, L.P.