Oil and natural gas: market outlook and drivers

for
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by
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Global supply has consistently exceeded demand since the start of 2014; EIA forecasts a return to market balance in the second half of 2017.
EIA expects WTI oil prices to remain low compared to recent history, but the market-implied confidence band is very wide.

Source: EIA, Short-Term Energy Outlook, May 2016
The U.S. has experienced a rapid increase in natural gas and oil production from shale and other tight resources.

Sources: EIA derived from state administrative data collected by DrillingInfo Inc. Data are through February 2016 and represent EIA’s official tight oil & shale gas estimates, but are not survey data. State abbreviations indicate primary state(s).
Long lead times and past investment are contributing to growth from the Gulf of Mexico as Lower 48 production declines.

U.S. crude oil production growth by area change from fourth quarter, 2014 (million barrels per day)

Source: EIA, Short-Term Energy Outlook, May 2016
Crude supply trends outside the United States (red areas below) are key to future oil market balance: geopolitical developments, exporter decisions, and the timing and magnitude of supply effects stemming from reduced investment all matter.

**2016 oil production, million barrels per day**
- Shale Regions: 5.60
- Other Lower 48: 0.87
- AK: 0.47
- GOM: 1.66

**2017 oil production, million barrels per day**
- Shale Regions: 5.10
- Other Lower 48: 0.79
- AK: 0.45
- GOM: 1.85

REST OF WORLD = 72.72

Source: EIA, Short-Term Energy Outlook and Drilling Productivity Report, May 2016; International Energy Agency
EIA forecasts global liquids consumption growth at 1.2 million b/d in 2016 and 1.3 million b/d in 2017

Source: EIA, Short-Term Energy Outlook, May 2016
Non-OECD economic growth projections, a key driver of oil demand, have been reduced over the course of recent STEO forecasts.

GDP growth in non-OECD countries annual expectations by date of forecast

Source: EIA, Short-Term Energy Outlook, May 2016
Global Energy: Drivers and Projections
Economic activity and population drive increases in energy use; energy intensity (E/GDP) improvements moderate this trend

average annual percent change (2012–40) percent per year

Renewables grow fastest, coal use plateaus, natural gas surpasses coal by 2030, and oil maintains its leading share

Most of the growth in world oil consumption occurs in the non-OECD regions — especially Asia

world petroleum and other liquid fuels consumption
million barrels per day

Passenger-miles per person will rise as GDP per capita grows; travel growth is largely outside the OECD

passenger-miles per capita (left-axis) and GDP per capita (horizontal-axis) for selected country groupings 2010–40

Liquid fuels supplies from both OPEC and non-OPEC producers increase through 2040

world production of petroleum and other liquid fuels
million barrels per day

Non-OECD nations account for 76% of projected growth in natural gas consumption

Non-OECD Asia, Middle East, and OECD Americas account for the largest increases in natural gas production

world change in natural gas production, 2012–40 trillion cubic feet

North American natural gas prices are low compared to prices in the rest of the world, although spreads have narrowed recently. Select global natural gas and crude oil prices with average monthly LNG prices in Japan. U.S. dollars per million British thermal unit.

Source: U.S. Energy Information Administration, Bloomberg L.P.
U.S. Energy Outlook
Key updates in AEO2016

• Incorporation of the U.S. Environmental Protection Agency’s final rules for the Clean Power Plan
• Updated renewable capital costs
• Latest California zero-emission vehicle sales mandates, which have been adopted by a number of other states
• Extension of the production tax credit for wind and 30% investment tax credit for solar
• Lower near-term crude oil prices
Reductions in energy intensity largely offset impact of gross domestic product (GDP) growth, leading to slow projected growth in energy use.

U.S. primary energy consumption (quadrillion Btu)

![Graph showing energy consumption trends from 1980 to 2040, with categories for Petroleum and other liquids, Natural gas, Liquid biofuels, Nuclear, and Coal. Projections under AEO2016 Reference and No CPP scenarios are compared.]

Source: EIA, Annual Energy Outlook 2016
U.S. net energy imports continue to decline (except for liquids in the near term) reflecting increased oil and natural gas production coupled with slowly growing or falling demand

Source: EIA, Annual Energy Outlook 2016
CO2 emissions are lower in AEO2016 Reference case than AEO2015 Reference Case, even without the Clean Power Plan (CPP)

energy-related carbon dioxide emissions
million metric tons

Source: EIA, Annual Energy Outlook 2016
U.S. Electricity
Clean Power Plan accelerates shift to lower-carbon options for generation, led by growth in renewables and gas-fired generation; results are likely sensitive to CPP implementation approach

electricity net generation
trillion kilowatthours

<table>
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<tr>
<th>Year</th>
<th>History</th>
<th>AEO2016 Reference</th>
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Source: EIA, Annual Energy Outlook 2016
Natural gas generation falls through 2021; both gas and renewable generation surpass coal by 2030 in the Reference case, but only natural gas does so in the No CPP case.

Source: EIA, Annual Energy Outlook 2016
Lower costs and extension of renewable tax credits boost projected additions of wind and solar capacity prior to the 2022 effective date of the Clean Power Plan (CPP)

annual capacity additions, gigawatts

Source: EIA, Annual Energy Outlook 2016
Reference case projects slightly higher levels of total capacity because of higher levels of renewable capacity.

Total electric generating capacity (gigawatts)

Notes: prior to 2000 wind and solar data is not broken out, and is reflected in ‘Other Renewable’; Hydro includes pumped storage.

Source: EIA, Annual Energy Outlook 2016
Changing tax and cost assumptions contribute to stronger solar growth, with the Clean Power Plan providing a boost to renewables

Renewable electricity generation by fuel type

Billion kilowatthours

Source: EIA, Annual Energy Outlook 2016

AFS | Oil and natural gas market outlook and drivers, May 18, 2016
U.S. Natural Gas
Shale resources remain the dominant source of U.S. natural gas production growth

U.S. dry natural gas production
tillion cubic feet

Source: EIA, Annual Energy Outlook 2016
Natural gas consumption growth is led by electricity generation and industrial uses; natural gas use rises in all sectors except residential

U.S. dry gas consumption
trillion cubic feet

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Source: EIA, Annual Energy Outlook 2016

*Includes combined heat-and-power and lease, plant, and export liquefaction fuel
**Includes pipeline fuel
For more information


Annual Energy Outlook | www.eia.gov/forecasts/aeo

Short-Term Energy Outlook | www.eia.gov/forecasts/steo

International Energy Outlook | www.eia.gov/forecasts/ieo

Today In Energy | www.eia.gov/todayinenergy

Monthly Energy Review | www.eia.gov/totalenergy/data/monthly

State Energy Portal | www.eia.gov/state