Annual Energy Outlook 2015

AEO2015 Rollout Presentation Center for Strategic and International Studies April 14, 2015 / Washington, D.C.

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Key results from AEO2015

- In most AEO2015 cases, U.S. net energy imports, including all fuels, decline and ultimately end by 2030 for the first time since the 1950s
 - Strong growth in domestic production of crude oil from tight formations through 2020 and limited growth in domestic demand after 2020 leads to a decline in net petroleum and other liquids imports
 - The United States transitions from being a net importer of natural gas to a net exporter by 2017 in all cases
- U.S. energy consumption grows at a modest rate over the projection with reductions in energy intensity resulting from improved technologies and trends driven by existing laws and regulations
- Renewables provide an increased share of electricity generation, reflecting rising long-term natural gas prices and the high capital costs of new coal and nuclear generation capacity



Key results from AEO2015 (continued)

- Improved efficiency of energy consumption in end-use sectors and a shift away from more carbon-intensive fuels help to stabilize U.S. energy-related carbon dioxide emissions, which remain below the 2005 level through 2040
- Growth of domestic crude oil and natural gas production varies significantly across regions and cases, leading to shifts in crude oil and natural gas flows between regions, requiring infrastructure adjustments
- The AEO2015 cases generally reflect current policies, including final regulations and the sunset of tax credits under current law; consistent with this approach, EPA's proposed Clean Power Plan rules for existing fossil-fired electric generating units or the effects of relaxing current limits on crude oil exports are not considered in AEO2015



Overview



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Crude oil price projection is lower in the AEO2015 Reference case than in AEO2014, particularly in the near term

Brent crude oil spot price

2013 dollars per barrel



Source: EIA, Annual Energy Outlook 2015 Reference case and Annual Energy Outlook 2014 Reference case

Reductions in energy intensity largely offset impact of GDP growth, leading to slow projected growth in energy use

U.S. primary energy consumption quadrillion Btu



Source: EIA, Annual Energy Outlook 2015 Reference case



U.S. net energy imports continue to decline in the near term, reflecting increased oil and natural gas production coupled with slow demand growth

U.S. net energy imports quadrillion Btu



Source: EIA, Annual Energy Outlook 2015



CO₂ emissions are sensitive to the influence of future economic growth and energy price trends on energy consumption

energy-related carbon dioxide emissions million metric tons



Source: EIA, Annual Energy Outlook 2015



CO_2 emissions per dollar of GDP decline faster than energy use per dollar of GDP with a shift towards lower-carbon fuels

energy and emission intensity index, 2005=1



Source: EIA, Annual Energy Outlook 2015 Reference case

New AEO table browser

- Signature product redeveloped for EIA's state-of-the-art table browser experience
- Compares up to 6 cases from AEO





Petroleum and other liquid supply



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AEO2015 explores scenarios that encompass a wide range of future crude oil price paths

Brent crude oil spot price

2013 dollars per barrel



Source: EIA, Annual Energy Outlook 2015



U.S. crude oil production rises above previous historical highs before 2020 in all AEO2015 cases, with a range of longer-term outcomes

U.S. crude oil production million barrels per day



Source: EIA, Annual Energy Outlook 2015



Growth of onshore crude oil production varies across supply regions, affecting pipeline and midstream infrastructure needs

change between 2013 and 2040 in U.S. lower 48 onshore crude oil production by region million barrels per day



Source: EIA, Annual Energy Outlook 2015



Combination of increased tight oil production and higher fuel efficiency drive projected decline in oil imports

U.S. liquid fuels supply million barrels per day



Note: "Other" includes refinery gain, biofuels production, all stock withdrawals, and other domestic sources of liquid fuels Source: EIA, Annual Energy Outlook 2015 Reference case

Net liquids imports provide a declining share of U.S. liquid fuels supply in most AEO2015 cases; in two cases the nation becomes a net exporter

net crude oil and petroleum product imports as a percentage of total U.S. supply percent





In the transportation sector, motor gasoline use declines; diesel fuel, jet fuel, and natural gas use all grow

transportation energy consumption by fuel quadrillion Btu



Source: EIA, Annual Energy Outlook 2015 Reference case

*Includes aviation gasoline, propane, residual fuel oil, lubricants, electricity, and liquid hydrogen



U.S. net exports of petroleum products vary with the level of domestic oil production given current limits on U.S. crude oil exports

U.S. petroleum product imports and exports



Source: EIA, Annual Energy Outlook 2015



Natural gas



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Future domestic natural gas prices depend on both domestic resource availability and world energy prices

average Henry Hub spot prices for natural gas





Source: EIA, Annual Energy Outlook 2015



Shale resources remain the dominant source of U.S. natural gas production growth

U.S. dry natural gas production trillion cubic feet

billion cubic feet per day



Source: EIA, Annual Energy Outlook 2015 Reference case



Natural gas consumption growth is driven by increased use in all sectors except residential



Source: EIA, Annual Energy Outlook 2015 Reference case

*Includes combined heat-and-power and lease and plant fuel **Includes pipeline fuel



Growth in manufacturing output and use of natural gas reflect high natural gas supply and low prices, particularly in near term

manufacturing natural gas consumption quadrillion Btu

billion cubic feet per day



Source: EIA, Annual Energy Outlook 2015 Reference case



Projected U.S. natural gas exports reflect the spread between domestic natural gas prices and world energy prices

U.S. natural gas imports and exports trillion cubic feet

billion cubic feet per day



Source: EIA, Annual Energy Outlook 2015

Electricity



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Source: EIA, Annual Energy Outlook 2015 Reference case

Over time the electricity mix gradually shifts to lower-carbon options, led by growth in renewables and gas-fired generation

electricity net generation trillion kilowatthours



Source: EIA, Annual Energy Outlook 2015 Reference case



Non-hydro renewable generation grows to double hydropower generation by 2040

renewable electricity generation by fuel type billion kilowatthours



Source: EIA, Annual Energy Outlook 2015 Reference case



Growth in wind and solar generation meets a significant portion of projected total electric load growth in all AEO2015 cases

U.S. renewable generation in all sectors by fuel billion kilowatthours



Source: EIA, Annual Energy Outlook 2015



For more information

U.S. Energy Information Administration home page | <u>www.eia.gov</u>

Annual Energy Outlook | <u>www.eia.gov/forecasts/aeo</u>

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

International Energy Outlook | <u>www.eia.gov/forecasts/ieo</u>

Today In Energy | <u>www.eia.gov/todayinenergy</u>

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

State Energy Portal | <u>www.eia.gov/state</u>

Drilling Productivity Report | www.eia.gov/petroleum/drilling



Preview of coming attractions



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Upcoming: improved international energy web presence

- New data browser to replace IES
- Better map-based navigations and visualizations
- Consolidate CABs/CANs
- Status: dev integration
- Launch: beta in April





Upcoming: EIA-930—hourly survey of electricity balancing authorities

- First near-real time report for EIA
- Dashboard view of the U.S. power grid
- Highly anticipated by EIA customers
- Status: dev largely complete; awaiting OES data to continue
- Launch: TBD





Upcoming: Final four reports on EIA crude oil exports

Over the next two months, the final four reports will cover:

- 1) technical options for U.S. refineries to facilitate the processing additional light tight oil
- 2) implications of increasing light tight oil production for the overall U.S. refining system
- 3) an update to EIA's May 29, 2014, report on projections of U.S. crude oil production by API gravity
- 4) the effects on oil prices, oil production, and oil trade if restrictions on U.S. crude oil exports were removed



Now playing: Crude by rail and EIA-914—data updates

- Both high priority
- Crude by rail due out with PSM, March 30
- Updated 914 expected in June with new data collection

immary table - mbbl	d Summ	nary table - i	mbbl Gr	aphic exam	iples F	PADD 1	
	Crude oil thousand	movements barrels/day	by rail, 201	4			
Region fromito	PADD 1	PADD 2	PADD 3	PADD 4	PADD 5	Total U.S.	Canada
PADD 1	0	427	0	39	0	466	67
PADD 2	0	32	1	17	0	50	2
PADD 3	0	113	30	109	0	252	47
PADD 4	0	0	0	0	0	0	0
PADD 5	0	165	9	27	8	210	4
Total US shipped	0	737	41	192	8	978	121
Canadian imports	0	20	0	6	0	26	0
Total rail reciepts	0	757	41	198	8	1,004	121

With Data through January 2015 | Release Date: March 30, 2015 | Next Release Date: April 27, 2015

NA = data not available

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U.S. Crude Oil By Rail Movements

Monthly crude oil, lease condensate, and natural gas

EIA-914 monthly production report

Release Date: August 11, 2014 | Next Release Date: September 8, 2014

roduction	n by state/area	API grav	ity by state/a	irea		
	XXXXXX			xxxxxx		
	xxx 2014	xxx 2014	change	xxx 2014	xxx 2014	change
XXXXX	x,xxx	x,xxx	x,xxx	x,xxx	X,XXX	X,XXX
XXXXX	x,xxx	x,xxx	x,xxx	x,xxx	x,xxx	X,XX
XXXXX	x,xxx	x,xxx	x,xxx	x,xxx	x,xxx	x,xxx
XXXXX	x,xxx	x,xxx	x,xxx	x,xxx	x,xxx	X,XXX
XXXXX	X,XXX	X,XXX	X,XXX	X,XXX	X,XXX	X,XX)
XXXXX	x,xxx	x,xxx	x,xxx	x,xxx	x,xxx	x,xx
Total	X,XXX	X,XXX	X,XXX	X,XXX	X,XXX	X,XX



Data tables:

- sqlf7 test⊄ Detailed movements by rail between PADD Districts and Canada - monthly 2010-2014 sqlf7 test@ Detailed movements by
- rail between PADD Districts and Canada - annual 2010-2014 sqlf7 test
 ^d
 Movements by pipeline,
- tanker, barge, and rail between PAD
- sqlf7 test@ Net reciepts by pipeline, tanker, barge and rail between PAD
- sqlf7 testd Movements of crude oil by pipeline, tanker, barge and rail between PAD Districts

Report and documentation

- 🖪 Data methodology
- 🗟 Trends in Crude Oil Movements by Rail

Related articles

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· Rail shipments of oil and petroleum
                            up 13% over
                            ) Energy,
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121

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Now playing: New Microsoft Excel add-in for Windows

 Enables spreadsheet users – inside and outside of EIA – to pull recent EIA/FRED data into their existing workbooks

U.S. Energy Information Administration (EIA) Excel Data Add-In

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Within the spreadsheet, you can browse each data repository by category or search by keywords to find data IDs and to download the series information and data. Once the desired data series are downloaded, all of Excel's rich functionality is available to create analyses and graph results.

Throughout the EIA website, the symbol \P^{m} is used to denote a link to a page with the series ID or source key and sample API calls. The series ID can be copied and pasted directly into Excel and the series data fetched with the EIA add-in. This is another way to load data series found on www.ela.gov into your workbook.

Currently, EIA's data API contains 1.2 million energy series. The 5t Louis Federal Reserve's API contains 240,000 economic series. Both organizations offer the data APIs, bulk data downloads, and Excel add-ins free of charge as part of their commitment to open data.



