

Estimated domestic crude oil production in EIA's Weekly Petroleum Status Report (WPSR)



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Key takeaways

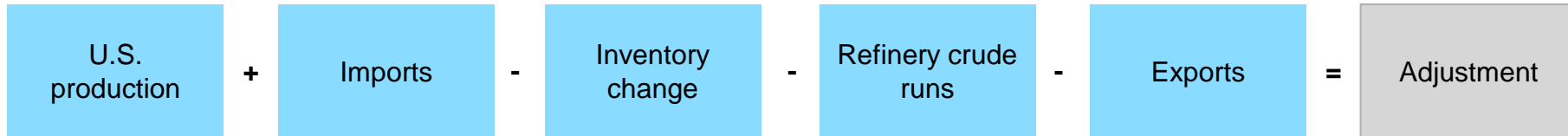
- Estimating crude oil production is a necessary element to assess weekly U.S. crude oil supply/demand balances
- Collecting weekly crude oil production data from operators is not feasible
- Estimating weekly national-level production volumes is complicated
- Estimates are driven by EIA's Short-Term Energy Outlook (STEO) model
- Track record compared to EIA's monthly production (survey-based) data is quite good

Crude oil production estimates are necessary for assessing weekly U.S. crude oil balances

- EIA's weekly (and monthly) petroleum reports balance the disposition and supply of crude oil
 - Refinery crude oil inputs (collected on EIA-800 survey)
 - Crude oil exports (estimated using U.S. Customs data)
 - Crude oil imports (collected on EIA-804 survey)
 - Crude oil inventories (collected on EIA-800 and EIA-803 surveys)
 - *Domestic crude oil production (estimated)*
- These supply and disposition elements are inter-related
- The degree to which all these elements fit is manifested in EIA's *crude oil adjustment*

U.S. crude oil production has become an important component of the supply/disposition balance

- EIA's crude oil balance is represented as:



- U.S. production has become a 9+ million barrel per day piece of this puzzle
- Massive volumes of data reported/modeled. How well does it all fit?
 - U.S. Production: 9.7 million barrels per day (b/d)
 - Imports: 7.5 million b/d
 - Inventories: 400 million barrels
 - Refinery Runs: 17 million b/d
 - Exports: 1 million b/d
- The adjustment quantifies the cumulative uncertainty surrounding these elements and typically is less than 2% of disposition

Collecting weekly crude oil production data is not feasible

- WPSR respondents report their data on Monday for the preceding Friday's weekly activity (i.e., two business days to turn around reports to EIA)
- Operators (roughly 12,000) and states are challenged to provide accurate reports for their monthly activity on the EIA-914 survey that is due 40 days after the month's end
- It's simply not feasible to get accurate data from these sources within the WPSR reporting window
- As a result, EIA uses the best available data we have to estimate current production

Estimating real-time U.S. production volumes is its own challenge

- Roughly 1.2 million current wells to account for across the country
- Production from these wells is driven by many factors
 - Multiple plays/regions with different characteristics
 - Changes in rig counts
 - New well initial production rates
 - Varying decline rates
 - Weather
 - Individual producers' specific operating factors and economic drivers
- There is no comprehensive source of real-time data that takes all of these factors into account

WPSR's estimate of U.S. production has three components

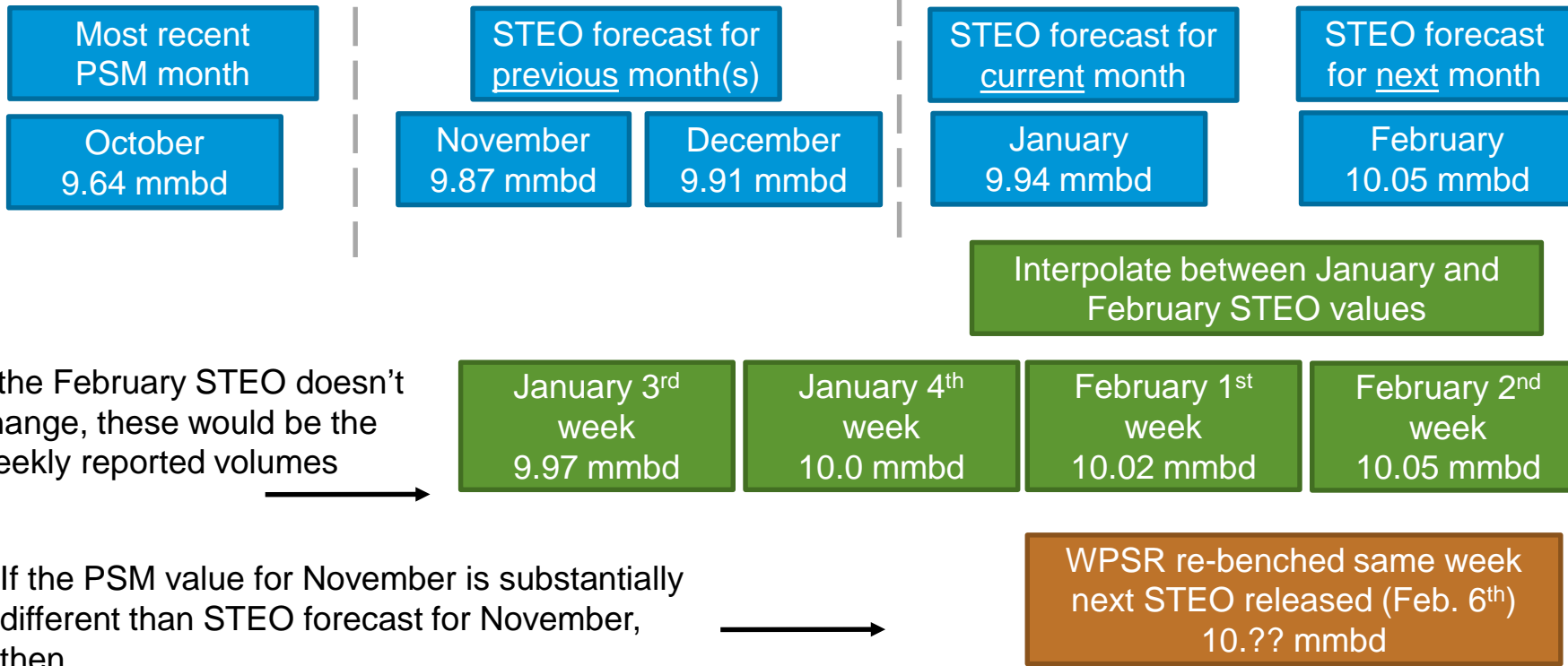
- **Alaska: volumes reported daily by the state**
 - Represents ~5% of total U.S. crude oil production
 - Estimated from deliveries to TAPS from the North Slope with lagged estimates for South Alaska production
- **Federal Gulf of Mexico: STEO-driven estimates**
 - Represents ~15-20% of total U.S. crude oil production
 - STEO forecast takes into account current and announced project start dates
 - Supplemented by updates from Bureau of Safety and Environmental Enforcement during times of disruptions (weather, operational issues, etc.)
- **Lower 48 States: STEO-driven estimates**
 - Represents ~75-80% of total U.S. crude oil production
 - STEO forecast takes into account WTI crude oil prices, rig counts, DrillingInfo intel, FracFocus completions, latest EIA-914, Drilling Productivity Report (DPR), industry financial filings/trade press, etc.

An explanation of the STEO crude oil production model

- Webinar was held on November 16, 2017
- Slides are available here:

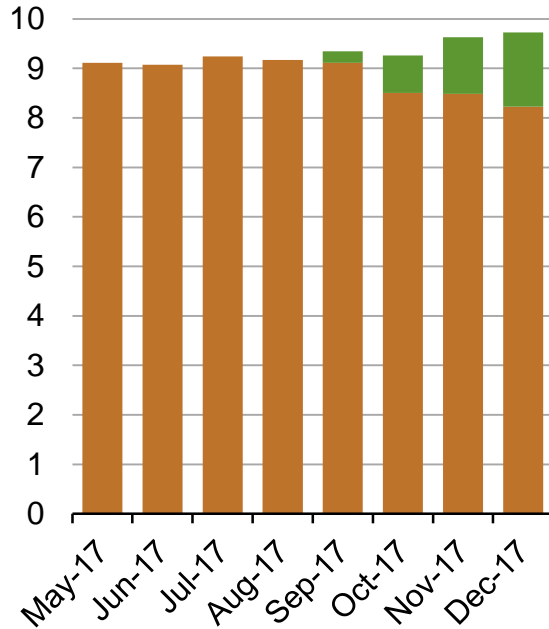
https://www.eia.gov/petroleum/workshop/crude_production

Brief overview of how STEO model forecast provides the WPSR weekly U.S. crude oil production estimate



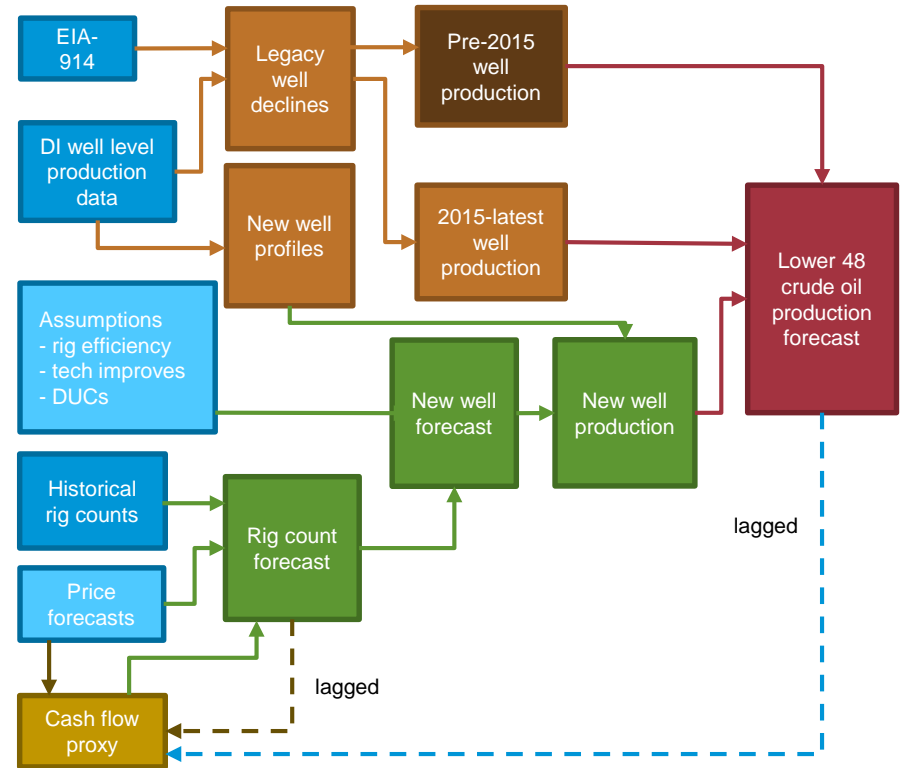
EIA forecasted 1.5 million b/d of new production in December 2017 from wells that started producing in Sept. through Dec. 2017

U.S. crude oil production
million barrels per day



Production from new wells Sept. through Dec.

Production from legacy wells



Source: EIA Short-Term Energy Outlook, November 2017

WPSR crude production estimates are later evaluated compared with EIA's monthly crude production survey data

- EIA-914 monthly survey is the most comprehensive and reliable estimate of U.S. crude oil production
 - Foundation for our monthly volumes reported in the Petroleum Supply Monthly (PSM)
 - Combination of operator-reported sample and state agency-provided data
 - Lagged two months (November operations to be published in January PSM)
 - Subject to small revisions for several months as additional data is provided to EIA
- Used to assess historic results of weekly estimates
- Used to re-benchmark weekly estimates going forward

Comparison of results from January 2016 to October 2017

- Since January 2016, EIA's weekly production estimates have typically ranged within 1 – 3% of Petroleum Supply Monthly data
- Average difference: 1.3% (absolute value)
- Average difference -0.3% (simple average)
- Largest difference: 3.7% (October 2017 – partially due to weather disruptions)
- WPSR estimates and PSM data showed same directional trend in 16 of 22 previous months

Domestic Crude Production Comparison

Month	PSM	PSM month on month change	MFW	MFW month on month change	PSM and MFW trend the same?	% diff
Jan-16	9,180		9,221			0%
Feb-16	9,100	-80	9,112	-109	yes	0%
Mar-16	9,128	28	9,038	-74		-1%
Apr-16	8,900	-228	8,915	-123	yes	0%
May-16	8,853	-47	8,767	-148	yes	-1%
Jun-16	8,696	-157	8,620	-147	yes	-1%
Jul-16	8,674	-22	8,484	-136	yes	-2%
Aug-16	8,709	35	8,515	31	yes	-2%
Sep-16	8,545	-164	8,490	-25	yes	-1%
Oct-16	8,784	239	8,513	23	yes	-3%
Nov-16	8,869	85	8,692	179	yes	-2%
Dec-16	8,768	-101	8,788	96		0%
Jan-17	8,851	83	8,947	159	yes	1%
Feb-17	9,070	219	9,017	70	yes	-1%
Mar-17	9,131	61	9,145	128	yes	0%
Apr-17	9,110	-21	9,267	122		2%
May-17	9,169	59	9,320	53	yes	2%
Jun-17	9,097	-72	9,320	0		2%
Jul-17	9,238	141	9,418	98	yes	2%
Aug-17	9,203	-35	9,344	-74	yes	2%
Sep-17	9,481	278	9,492	148	yes	0%
Oct-17	9,637	156	9,283	-209		-4%

Next steps

- EIA plans to show weekly U.S. production estimates rounded to nearest 100,000 barrels
 - for example: 9.741 million b/d estimate would be published as 9.700 million b/d
 - Still show Alaska production as currently reported
 - Round Lower 48 to nearest 100,000 barrels
- EIA will continue to benchmark weekly estimates against PSM volumes and make continuous improvements to the STEO model
- We are always interested in ideas and data sources that can help us sharpen our estimates

For more information

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

EIA-914 | www.eia.gov/petroleum/production

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

TWIP | www.eia.gov/petroleum/weekly

Today in Energy | www.eia.gov/todayinenergy