Which Country Is the Largest Oil Producer in the World – the USA, Russia or Saudi Arabia: The Question of Measurement – What and How

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To cite this article: Eugene Khartukov. Which Country Is the Largest Oil Producer in the World – the USA, Russia or Saudi Arabia: The Question of Measurement – What and How. American Journal of Energy Engineering. Vol. 9, No. 1, 2021, pp. 8-18. doi: 10.11648/j.ajee.20210901.12

Abstract: Current and past statuses and dynamics of oil production and methods of oil measurements in different countries – under different temperatures and pressures – are considered and analyzed. The author uses methods of comparative and systematic analyses, which are implemented for assessing oil production in the USA, Saudi Arabia and Russia – the world’s leading oil producers – and globally (in the world’s context) in the past, currently and in the foreseeable future (throughout 2050). Crude oil and field (crude + lease NGLs) are considered. Oil developments in the USA, Saudi Arabia and Russia are analyzed separately with their main oil fields being covered. In the past a status of the world’s largest oil producer was taken in rotation by Russia and Saudi Arabia. Before 1992 the world supremacy in oil belonged to Russia but afterwards and until 2014 – mainly to Saudi Arabia. The article mainly concludes that now (since 2014) the USA produce more oil (crude oil + field condensate) than any other country of the world, even without accounting for indigenous biofuel liquids and mostly thanks to the massive tight-oil production.

Keywords: Crude Oil, Natural Gas Liquids/Condensate, Temperature, Pressure, STP, The USA, Russia, Saudi Arabia

1. Introduction

It is widely accepted that the current top oil producers are the USA, Russia and Saudi Arabia, which produced all together in 2019 some two fifths of the world’s field production of oil (that is of the global crude oil and lease condensate output) (Figures 1-3), but there are some nuances… (see below).
Individually speaking, Saudi Arabia is not king of the oil production hill, for its nemesis – the country that sought to undo every production quota OPEC could come up with, is the United States. On its own, the United States produced 19.51 million barrels of oil (and other petroleum liquids) per day, besting both Saudi Arabia and Russia, and controlling 19% of the world’s oil supplies (Figure 3).

In its turn, the highly reliable statistics of BP (with actual annual data for 2020 being expected only in June-July 2021) tell that the USA, Russia and Saudi Arabia produced in 2019 746.7, 568.1 and 556.6 mln tonnes of crude oil and other oil liquids (NGL) correspondingly (or nearly 42% as a total) (Figure 4).

**1.1. Russia**

At the end of 2016, according to the Russian statistical agency (Roskomstat), the country once again became the world’s largest oil producer, having outstripped in December Saudi Arabia (10.509 mln b/d compared with 10.424 mln b/d in November vs. 10.474 and 10.623 mln b/d in Saudi Arabia) [5] (see also Table 3).

### 1.1.1. Current Status

As per the well-informed US Energy Information Administration (EIA/DoE), Russia’s production of crude oil + lease condensate was on the average (in kb/d) as follows: in 2015 -10,551, in 2016 – 10,580, in 2017 – 10,759 and in 2018 – 10,847 [6].

![Table 1](https://minenergo.gov.ru/activity/statistic)

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Source: compiled and calculated on the basis of Ministerstvo energetiki RF https://minenergo.gov.ru/activity/statistic [7]
1.1.2. A Bit of History

Talking about the history, Russia’s oil production reached its peak in 1987 (11,416 mln b/d of field oil, according to BP) before a great dip of the 90s, caused by total disorganization of the industry (and the national economy), – down to less than 6 mln b/d in the second half of the 90s (Figure 6).

It is noteworthy that remaining oil reserves of Russia are considered hard-to-recover ones and are located quite unevenly. In 2019, up to 80% of Russia’s recoverable oil reserves was associated with operating oil fields while a share of hard-to-recover oil reserves was estimated by Russia’s Minprirody at 60% [10]. Most of oil reserves is concentrated at 11 unique (≥ 300 mln tonnes per Russian classification) and 179 large (≥ 30 mln tonnes of recoverable oil) fields of mainly the Khanty-Mansi autonomous okrug (KhMAO), in the Western Siberia, which contain as a total some 70% of reserves and account for two thirds of oil production in the country [11].

Russian oil production was growing despite Russia participated in the so-called OPEC + deal. It is well known that, in December 2016, 24 oil producers (13 OPEC members and 11 non-member countries) had struck a deal to withdraw from the world oil market since the start of 2017 1.8 mln b/d of their combind oil production (compared with October 2016) to buoy
up the declining world oil prices. Russia pledged to cut its oil production by 300 kb/d (but I wonder which Russian profitably oil-producing company was about to do it as it was the promise of the Russian officials who – by law – have no right to regulate an entity’s output… Neither it would be possible to command any decrease in national oil production as the oil industry in Russia is currently almost entirely privatized …) while Saudi Arabia – the leading cutter – obliged to reduce its national oil production by 486 kb/d. The accord was extended several times and its terms were changed depending on the market’s status. In particular, it was decided until the end of 2019 to decrease the collective oil production by 1.2 mln b/d (compared with October 2018) while the combined cut in the first quarter of 2020 was set at 1.7 mln b/d.

In December 2019, Russia managed to exclude gas condensate from the agreement’s all national pleges to make them in line with the OPEC quotas. As a result, at the end of 2019, the RF should lower its oil output by from a new basic level of 10.626 mln b/d (instead of 11.421 mln b/d of crude and field condensate) while in the 1Q of 2020 – only by 300 kb/d [12]. Moreover, the practical difficulty lies in the fact that neiter the Roscomstat, the Russian statistical state agency, nor the CDU TEK, the RF Minenergo’s official information service, report Russian oil production excluding condensate…

Furthermore, at least since the beginning of 2020, the RF Minenergo started to falsify Russian oil production data to make them more consistent with the OPEC + pledge.

1.2. Saudi Arabia

With its some 260+ remaining known oil reserves is the world’s largest holder of conventional oil and can keep production at 12 mln b/d until at least 2033.

1.2.1. Current Situation

As for the recent years, the omniscient U.S. Energy Information Administration of the US Minenergo (EIA/DoE) determines it in Saudi Arabia as follows (in kb/d, average): 2015 – 10,168; 2016 – 10,461; 2017 – 10,134; 2018 – 10,425 and 2019 (showing an obvious decrease) – 9,826 [13].

As for the kingdom’s quarterly field oil production, it, according to the US EIA/DoE, has gone down from 9,884 mln b/d in the last quarter of 2019 to 8,821 mln b/d in the 3Q of 2020 (Figure 7).

Figure 7. Quarterly Production of Crude Oil + Field Gas Condensate in Saudi Arabia in 1992-2020 (according to EIA), in mln b/d.
Source: https://www.eia.gov/international/data/world/petroleum-and-other-liquids/quarterly-petroleum-and-other-liquids-production/SAQ [14]

According to the London-based CEIC Data services, Saudi Arabia’s production of crude oil (that is excluding condensate or other field NGLs) in November 2020 was only 8,963 kb/d (Figure 8).

Source: https://take-profit.org/en/statistics/crude-oil-production/saudi-arabia [15]

Figure 8. Monthly Production of Crude Oil in Saudi Arabia in 1973-2020 (according to CEIC), in kb/d.

As it is known, Saudi Arabia restricts and curtails its oil output under actually self-imposed national production quotas and as an active participant of the OPEC+ deal (see above).

Saudi oil production peaked in 2016 (at nearly 12.41 mln b/d, according to BP), ranking 2nd in the world, and was annually lowering since.
1.2.2. Main Fields

Current Saudi production comes mostly from five giant but aging and fast-depleting oilfields (Ghawar, Safaniya, Hanifa, Khurais and Zuluf), all of which are more than 70 years old and are being kept producing by a huge injection of water. They have over the years accounted for more than 90% of Saudi oil production with the Ghawar field providing some half of the total [3].

Ghawar, in the Eastern Province, is the largest conventional oil field in the world located at 280 km × 30 km. It was discovered in 1948, started production in 1951, and is owned and operated by Saudi Aramco. Some sources claim that the Ghawar peaked in 2005, though this is denied by the field operators. The field holds estimated 170 billion barrels of original oil in place (OOIP), with some 140 bln bbl being regarded as recoverable [16].

1.2.3. Production Capacity

Saudi Arabia has the world’s largest spare capacity in oil production and used to utilize it for being a swing oil producer within the OPEC (as well as globally) (Table 2).

Table 2. Oil Production Capacity and Production in Selected Countries (in April 2020 and as of the start of 2020), in kb/d. (1) April production vs recent peak. (2) Assumes 400 kb/d from Saudi-Kuwait Neutral Zone

| Country        | Immediately available (1) | Additional available by January 2020 (2) |
|----------------|---------------------------|------------------------------------------|
| Saudi Arabia   | 1,190                     | 200                                      |
| UAE            | 270                       | 180                                      |
| Iraq           | 120                       | 260                                      |
| Kuwait         | 200                       | 0                                        |
| Russia         | 220                       | 150                                      |
| Subtotal       | 2,000                     | 790                                      |
| Iran           | 2,750                     | Potential Downside, in kb/d              |
|                |                           | – 650                                    |
| Venezuela      | 850                       | – 500                                    |
| Subtotal       | 3,600                     | – 1,150                                  |

Source: Oil Supply Crunch to Test OPEC’s Spare Capacity https://www.oilandgas360.com/oil-supply-crunch-to-test-opecs-spare-capacity [17]

1.2.4. Outlook

The future of the kingdom’s oil production is, however, quite gloomy, which is felt even now. Due to natural depletion of discovered oil fields and the recent lack of major discoveries in the country, its oil output goes down, which is especially the case for the foreseeable future. Unsurprisingly, already in 2007 some Western oil analysts (particularly, Euan Mearns of the University of Aberdeen) foresaw Saudi Arabia’s annual oil output going down to some 6 mln b/d by the end of the 20s from the predicted peak of nearly 12 mln b/d in around 2011 (Figure 8).

Figure 9. Location of Saudi Main HC Fields.

Figure 10. Oil Production in Saudi Arabia in 1936-2028, in kb/d.
Back in the beginning of 2020, there were quite difficult negotiations on production cuts between Saudi Arabia and Russia within the OPEC+ deal (see above), which were immediately labeled by Western journalists as the price war. In fact, there was no war as such, simply Russian officials did not agree with initially recommended cuts (and the deal was crucially at stake) but the impasse had ended in April 2020 and the OPEC + agreement was extended further, with the pledged cuts of nearly 10 mln b/d [19]. As a result, average spot price of Brent blend and of Dubai and WTI crudes has gone up from some $3/bbl at end-April and got stabilized at around $40/bbl in the 3Q of 2020 (Figure 12).

Saudi Arabia’s economy relies heavily on petroleum. According to the Forbes magazine, petroleum accounts for roughly 87 percent of the country’s budget revenues, 32 percent of GDP, and 81 percent of export earnings [21]. A look at the distribution of global oil reserves by country shows that only Venezuela possesses a higher share in global oil reserves than this Arab state [22].

1.3. USA

In October 2018, thanks to aggressively growing “shale-oil” (tight-oil) production, the country, which produced in that month as a total 11,554 kb/d of crude oil and lease condensate, according to the EIA [23], has become the world’s largest oil producer, having overtaken this world supremacy status from Russia (see also Table 3).

1.3.1. Where

The largest oil-producing fields (formations) in the USA include the Permian in Texas and in New Mexico, the Eagle Ford Shale in Texas, and the Bakken formation in North Dakota and Montana, Prudhoe Bay field in northern Alaska (by the way, the largest oil field in both the United States and North America, discovered in 1967 and located at 213,543 acres), the Wattenberg Field in Colorado (producing both gas and oil), the Shenzi field in the Gulf of Mexico, the Kuparuk River field in northern Alaska, west of the Prudhoe Bay, the Midway-Sunset oil field in California, the Atlantis oil field in the Gulf of Mexico, and Sugarkane field in Texas (Figure 14).
1.3.2. Prospects

As per the EIA, average field oil production in the USA actually was (in kb/d) 12,781 in 2015, 8,852 in 2016, 9,371 in 2017, 10,964 in 2018 and 12,248 in 2019 [25] and was predicted at the very end of 2020 – under a reference scenario – to go slightly down by 2050 to 11.96 mln b/d. Included was the tight-oil production, which was 7.99 mln b/d (65% of the total) in 2019 and 8.74 mln b/d (73%) in 2050 [26].

Within its near-term forecast, EIA expects U.S. field crude oil production to fall from the average 12.25 million b/d in 2019 to 11.3 million b/d in 2020 and 11.1 mln b/d in 2021 (Figure 15) [27, 28].
Moreover, the estimated pandemic-driven 0.8 million bpd year-over-year out-put fall in 2021 is the largest annual decline in US crude oil production on record, the EIA says [28].

At any rate, “shale-oil” (tight-oil) production was instrumental in rising US total oil output up to and over 10 mln b/d – while conventional oil production was roughly stable – at around 4,000-5,000 kb/d, – tight-oil one was dramatically increasing with only inconsiderable decrease during an obvious fall of domestic oil prices in 2014-2016 (Figure 16).

![Figure 16. US Oil Production in 2010-2018, in kb/d.](https://www.stlouisfed.org/on-the-economy/2018/may/rise-shale-oil)

**Figure 16.** US Oil Production in 2010-2018, in kb/d.

### 2. What Should Be Noted

It is important not to overlook the fact that available oil production data usually relate to the production of crude oil + lease (or mixed/field) condensate.

Bearing in mind the differences in measuring oil volumes at standard temperature and pressure (or, shortly, STP), which are currently accepted in Russia and the USA (and actually worldwide, excluding Russia and some major buyers of Russian crude), it noteworthy that in order of bringing the Russian oil volumes (traditionally and officially measured at 20°C and 760 mmHg) to the US conditions (60°F and and 14.696 psia) one needs to decrease the Russian volume by 1.54% (Figure 17) [30].

![Figure 17. Oil Volumes under the U.S. and Russian Current STP, in %](https://www.stlouisfed.org/on-the-economy/2018/may/rise-shale-oil)

**Figure 17.** Oil Volumes under the U.S. and Russian Current STP, in %.

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3. Who Is the Leader

All in all, if we consider a period since the middle of the 80s, when oil production data for Russia started to be published, and typical field oil production data (that of crude oil + lease condensate), the world’s largest oil producer varied as follows: until 1992 it was Russia, then until 2009 a status of the biggest oil-producing country was surely held by Saudi Arabia, then again – for a short time, until 2011 – it was overtaken by Russia, in 2011 Saudi Arabia anew though shortly has acquired the status of the world’s oil leader, in 2016 this status has moved from the USA for two years only back to Russia and finally since 2018 the USA have become the world’s largest oil producer – thanks to their fast-growing tight-oil production – for how long?.. (Table 3).

**Table 3.** Annual Field Oil Production by the World’s Largest Oil-Producing Countries in 1985-2020, in kb/d.

| Year | USA | Russia | Saudi Arabia |
|------|-----|--------|--------------|
| 1985 | 10,580 | 10,863 | 3,601 |
| 1986 | 10,231 | 11,247 | 5,208 |
| 1987 | 9,944 | 11,416 | 4,450 |
| 1988 | 9,765 | 11,373 | 5,656 |
| 1989 | 9,159 | 11,070 | 5,363 |
| 1990 | 8,914 | 10,342 | 7,106 |
| 1991 | 9,076 | 9,264 | 8,820 |
| 1992 | 8,868 | 7,978 | 9,092 |
| 1993 | 8,583 | 7,119 | 8,939 |
| 1994 | 8,389 | 6,371 | 8,983 |
| 1995 | 8,322 | 6,236 | 8,974 |
| 1996 | 8,295 | 6,062 | 9,087 |
| 1997 | 8,269 | 6,171 | 9,005 |
| 1998 | 8,011 | 6,110 | 9,267 |
| 1999 | 7,731 | 6,119 | 8,524 |
| 2000 | 7,733 | 6,583 | 9,121 |
| 2001 | 7,670 | 7,106 | 8,935 |
| 2002 | 7,624 | 7,755 | 8,207 |
| 2003 | 7,368 | 8,602 | 9,628 |
| 2004 | 7,250 | 9,335 | 10,306 |
| 2005 | 6,901 | 9,598 | 10,839 |
| 2006 | 6,825 | 9,834 | 10,671 |
| 2007 | 6,857 | 10,057 | 10,269 |
| 2008 | 6,783 | 9,965 | 10,655 |
| 2009 | 7,267 | 10,152 | 9,709 |
| 2010 | 7,558 | 10,379 | 9,865 |
| 2011 | 7,883 | 10,533 | 11,079 |
| 2012 | 8,926 | 10,656 | 11,622 |
| 2013 | 10,099 | 10,807 | 11,393 |
| 2014 | 11,801 | 10,860 | 11,519 |
| 2015 | 12,781 | 11,007 | 11,998 |
| 2016 | 8,852 | 10,551 | 10,461 |
| 2017 | 9,371 | 10,580 | 10,134 |
| 2018 | 10,964 | 10,759 | 10,425 |
| 2019 | 12,248 | 10,847 | 10,145 |
| 2020 | 11,100F | 9,414E | 9,140E |

Note: 1985-1999 – production of crude oil + field NGLs, according to BP; from 2000 – field production (crude oil + lease/field condensate), according to the EIA

Source: compiled by the author based mainly on https://BP Statistical Review of World Energy June 2020 [4] and https://www.eia.gov/international/data
4. No NGL

However, if we consider only crude oil (that is exclude lease/field condensate or any other NGLs, a lot of which is produced in Russia – on the average, some 0.75 mb/d in the recent years or around 7% of its total oil output – and in the USA – 5.4 mb/d (0.44%) in 2019) [23], some differences in the world’s supremacy in 1985, 1991, 2014-2015 and 2018 occur but they, though important for those years, do not considerably change the general picture (Figure 19).

5. Outlooks Throughout 2050

In line with the last annual report of the interna-tional peak-oil organization (ASPO), the 3 top oil producing countries will produce by 2050 slightly less of their oil (Figure 20).

5.1. USA

According to the last long-term forecast (the beginning of 2021) of the Energy Information Administration of the US Department of Energy (EIA/ DoE), field oil production in the country must decrease by 2050, under a reference scenario, from a maximum of more than 14 mln b/d in 2027-2035 to a bit less than 12 mln b/d (Figure 21).

Source: estimated and drawn by the author mainly based on Table 3, https://take-profit.org/en/statistics/crude-oil-production/saudi-arabia [15], https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRFPUS1/2&f [23]

Source: http://peakoilbarrel.com/world-oil-2018-2050 [31]

Source: Saudi Arabia Eyes Total Dominance In Oil
https://oilprice.com/Energy/ Crude-Oil [3]
5.2. Russia

As for Russia’s long-term prospects, the Moscow-based Energy Research Institute of The Russian Academy of Sciences (ERI RAS) predicts oil production by 2040 in its basic scenario the following way (Figure 22):

![Figure 22. Oil + Lease Condensate Production in 2010-2040, in mln b/d](http://peakoilbarrel.com/russias-take)

In its turn, the all-knowing EIA predicts, however, that Russian annual field oil production must go up by 2050 from less than 11 mb/d to more than 13 mb/d and Russia must overtake the USA in this respect (Figure 23).

![Figure 23. The EIA’s Forecast of Russia’s Annual Field Oil Output till 2050, in mln b/d.](http://peakoilbarrel.com/world-oil-2018-2050)

5.3. Saudi Arabia

Based on the ASPO estimates, the Saudi oil production is projected to peak in 2030 at 606 million tonnes and to lessen to around 500 mln t per year by the middle of this century (Figure 24).

![Figure 24. Actual and Projected Annual Field Oil Production in Saudi Arabia in 1980-2050, in mln tonnes per year.](http://peakoilbarrel.com/world-oil-2018-2050)

6. Conclusion

So, based on the above considerations, and if all field NGLs are included, currently, since 2019, the world’s largest oil producer is the USA, fol-lowed by Saudi Arabia and Russia, and this is unlikely to change in near future.

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Biography

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