



## New US oil and gas production update

### Table of contents

	page
-introduction	2
-US oil production	2
-Crude oil	5
-NGL	5
-LTO	5
-Permian	12
-Eagle Ford	13
-Bakken	14
-Niobrara	15
-New Mexico	16
-Eagle Ford	12
-Bakken	13
-Niobrara	14
-Gulf of Mexico	17
-shallow water depth <1000 ft	19
-deepwater depth >1000 ft	21
-oil forecasts	22
-Alaska oil	25
-US less Alaska, GoM & LTO oil production	27
-US crude oil & NGL production	28
-NGPL	29
-US, Alaska, GOM & LTO crude oil production	30
-US NG production	31
-GoM	37
-Alaska	39
-Permian	41
-Appalachia	42
-Haynesville	44
-Eagle Ford	45
-EIA/AEO oil production forecast evolution	46
-EIA AEO NG production forecast evolution	47
-oil & NG production & forecast in volume	48
-production in energy = quad	49
-comparison with world oil production	51
-comparison with previous study	53
-GOR	54
-population & fertility & migration	55
-oil and gas price	58
-oil, gold & wheat price	61
-gold & silver price ratio	62
-NG price	63
-LNG = Liquefied Natural Gas	66
-conclusion	67

## **-Introduction**

My previous papers on US oil production are available at:

-<https://aspofrance.org/2025/02/25/forecast-of-world-and-us-energy-production-jean-laherrere-17-fevrier-2025/>

-<https://aspofrance.org/2024/12/02/us-fossil-fuel-production-forecast/>

-<https://aspofrance.org/2024/05/26/us-ng-production-forecast/>

The data comes from the US EIA (Energy Information Administration) but in fact EIA data is not measured but estimated (see form 914)

<https://www.eia.gov/petroleum/production/pdf/eia914methodology.pdf>

The EIA US data comes from producers in the 50 States, meaning many agencies, many sources!

In contrast, data for the Gulf of Mexico is a real measure from BOEM from 2001 to 2019, i.e. only one source <https://www.data.boem.gov/Main/FieldReserves.aspx>! But since 2020 BOEM is drifting!

Some of past US oil production data included condensate within the category crude oil, mainly for oil stripper wells (wells that produce <15 b/d which are 77% of US wells, 10% of the US oil production, source Wikipedia).

US production data is not accurately measured (contrary to most countries such as UK or Norway or France). This is one reason I never use more than 2 significant digits for energy data: those who use more than 2 digits in energy papers show that they do not realize the uncertainty of the data!

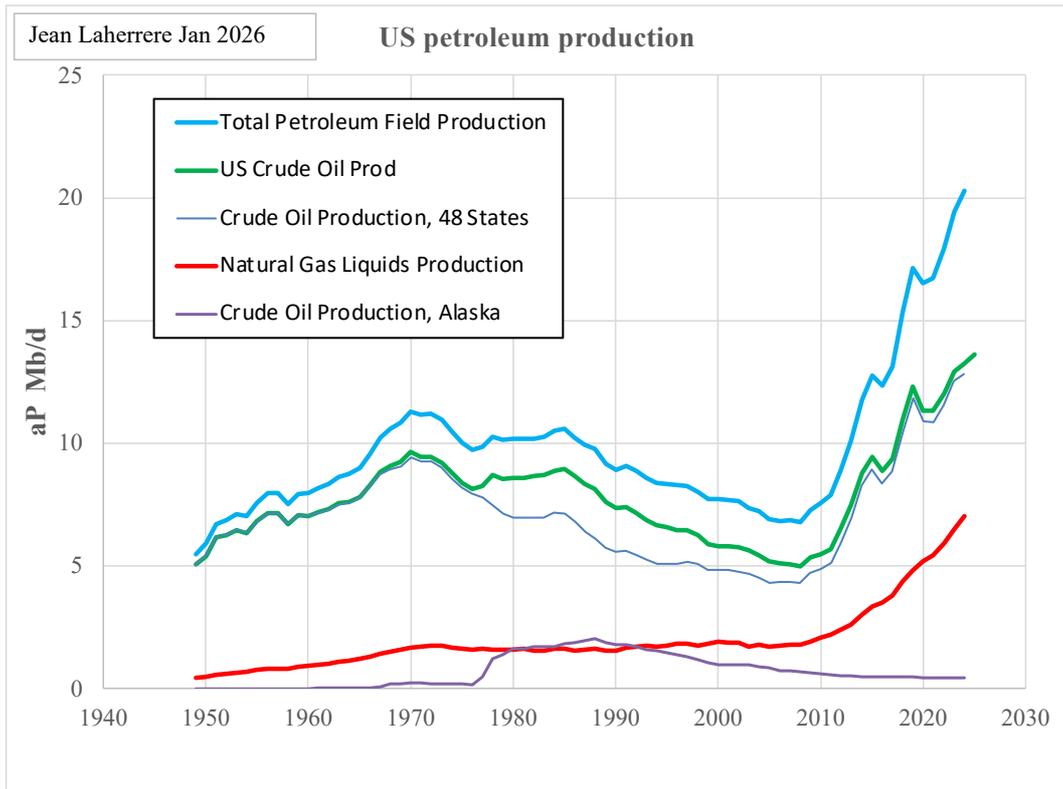
Financial data are usually more accurate; each digit is real, but in energy papers two digits is enough!

The oil producer does not know exactly how much oil he will recover in a reservoir until the last barrel is reproduced. The oil producer can guess the volume of porosity from wells and from seismic, and the recovery factor from known depleted productions. Thus, to forecast future production, I prefer to use Hubbert linearization (see Wikipedia) where possible, which is at least explicit and reproduceable.

Hubbert linearization technique is useless for US crude oil trending towards infinite, in contrary with US LTO. If HL is useless, I model future production with a best fit!

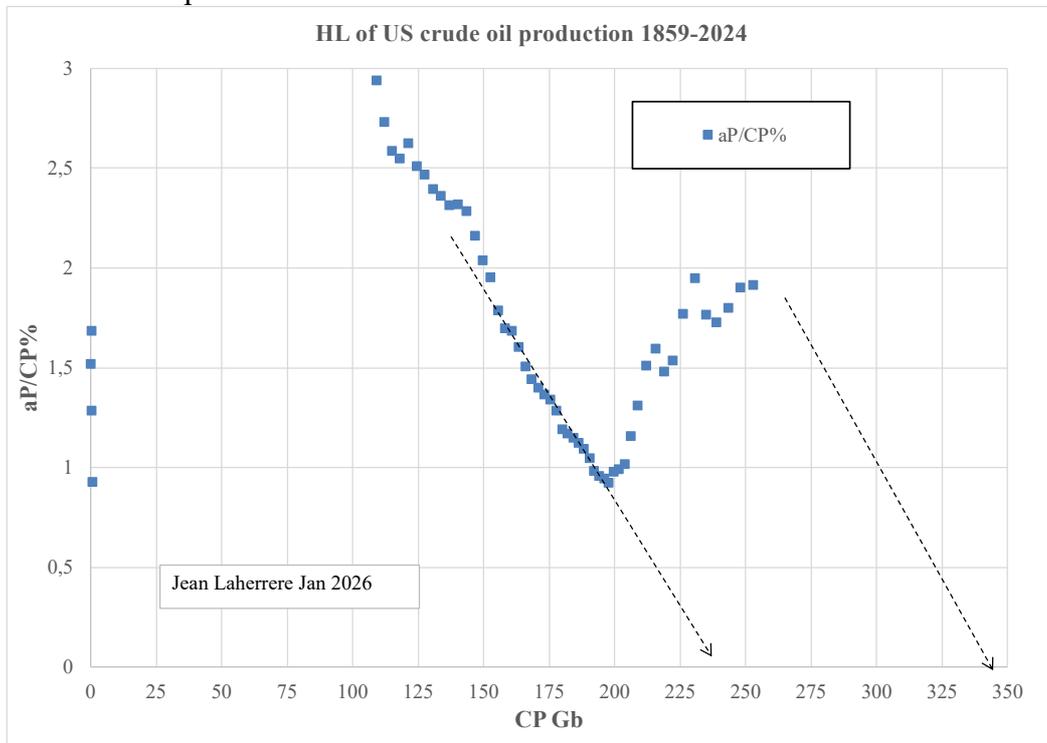
## **-US oil production**

US petroleum production 1949-2024 displays, after a 1970 peak, an increase since 2008

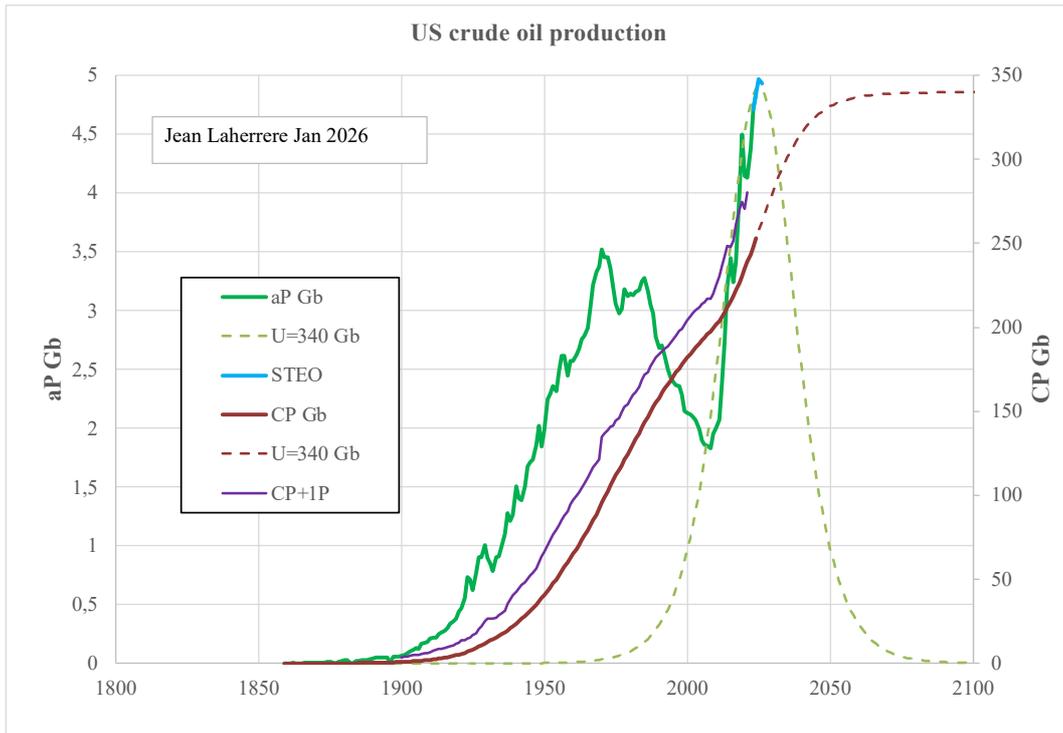


### -Crude oil

HL of US crude oil production trends towards infinite



A 340 Gb crude oil ultimate is chosen by best fit, using also STEO forecast



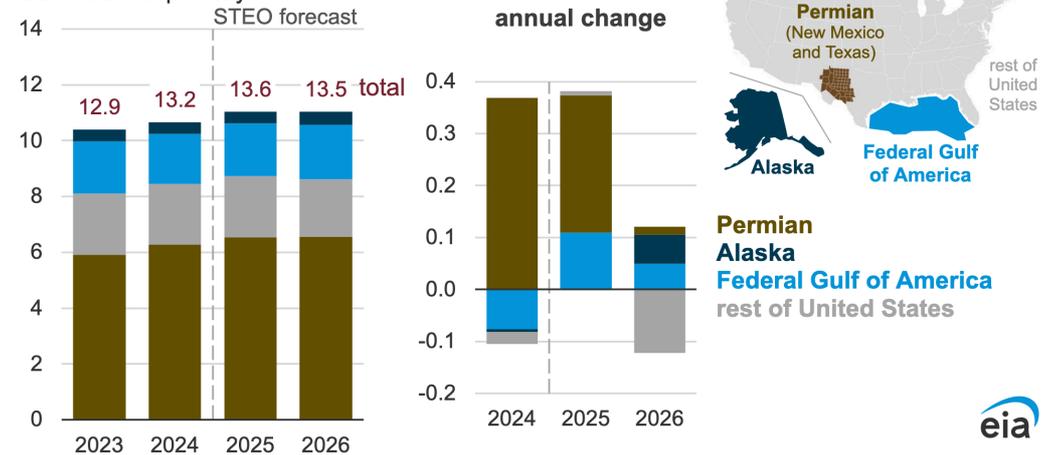
EIA forecasts in Dec 2025 US crude oil production with a peak in 2025 at 13.6 Mb/d  
<https://www.eia.gov/todayinenergy/detail.php?id=66844>

DECEMBER 12, 2025

## EIA forecasts U.S. crude oil production will decrease slightly in 2026

### U.S. crude oil production by region (2023–2026)

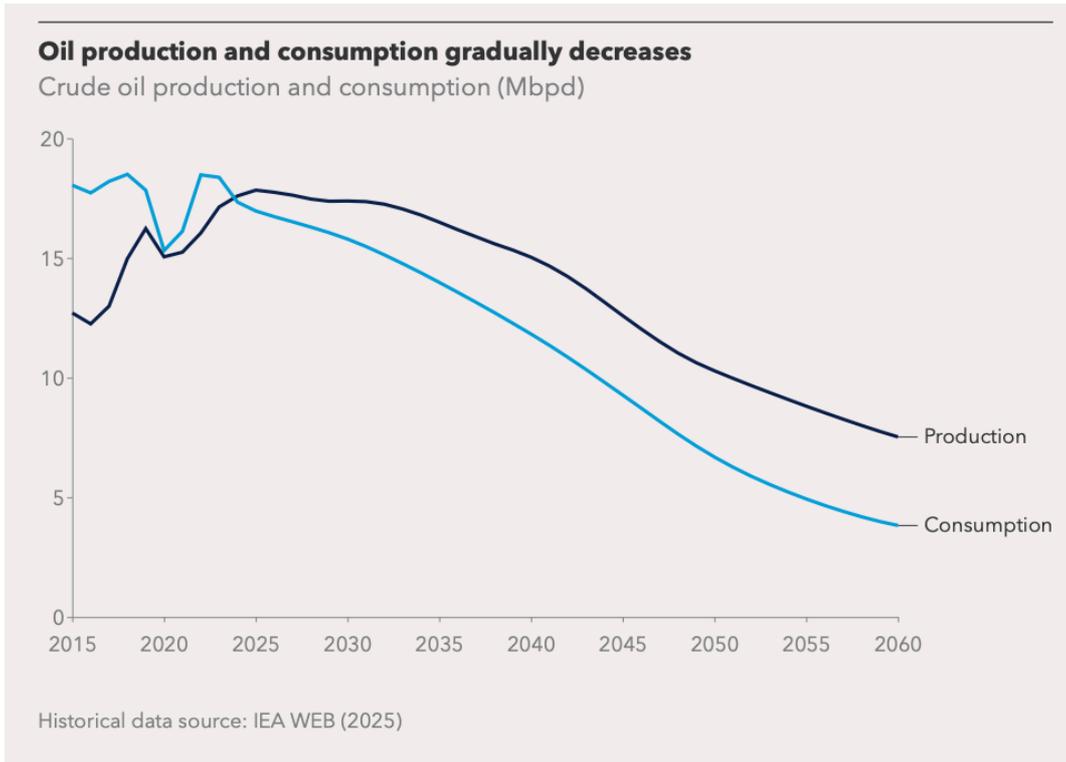
million barrels per day



Data source: U.S. Energy Information Administration, *Short-Term Energy Outlook* (STEO), December 2025

### DNV (Det Norske Veritas) ENERGY TRANSITION OUTLOOK NORTH AMERICA 2025

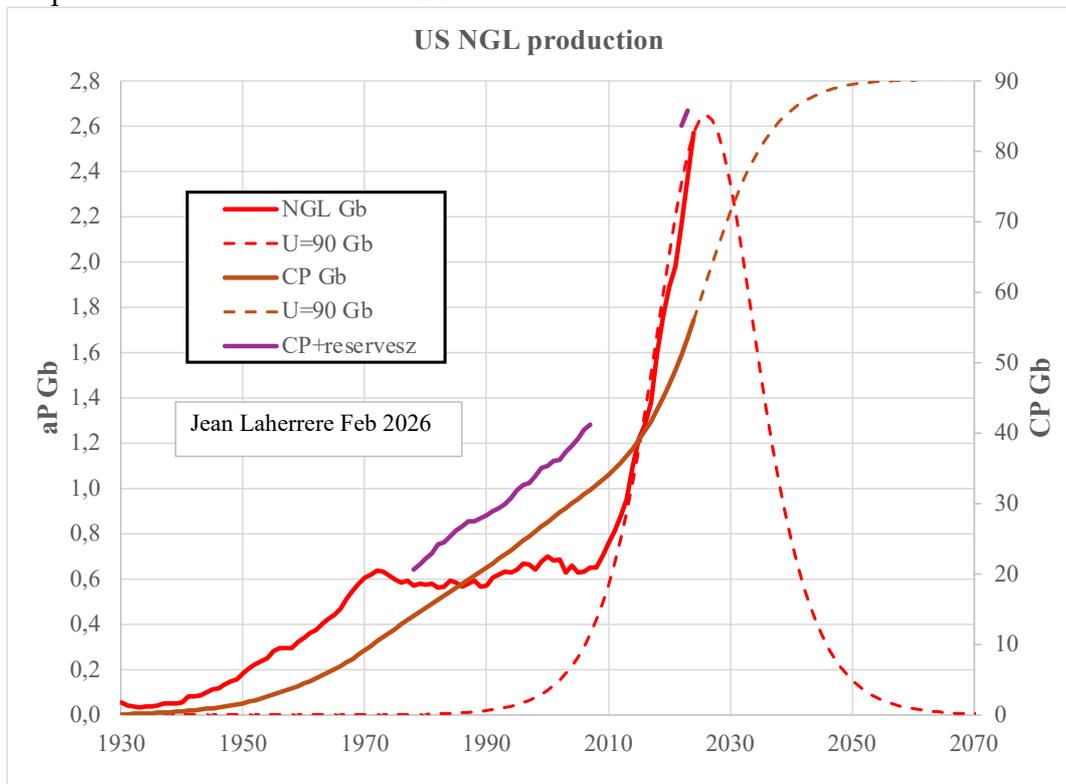
<https://brandcentral.dnv.com/original/gallery/10651/files/original/5182c6b1-3135-4e8d-9d37-096610c6fb79.pdf> displays oil production (EIA black curve peaking in 2025) & consumption (blue) for North America 2015-2060



**-NGL production**

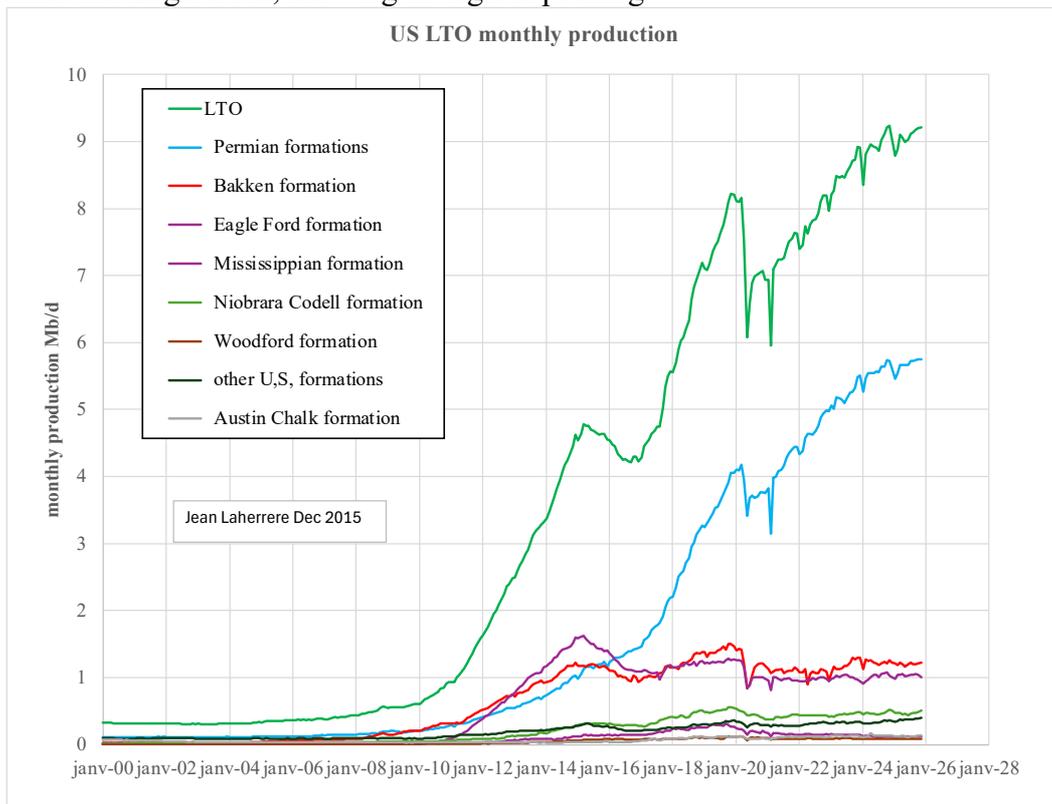
HL is useless and a best fit leads to a 90 Gb ultimate

US NGL production is forecasted for 90 Gb ultimate

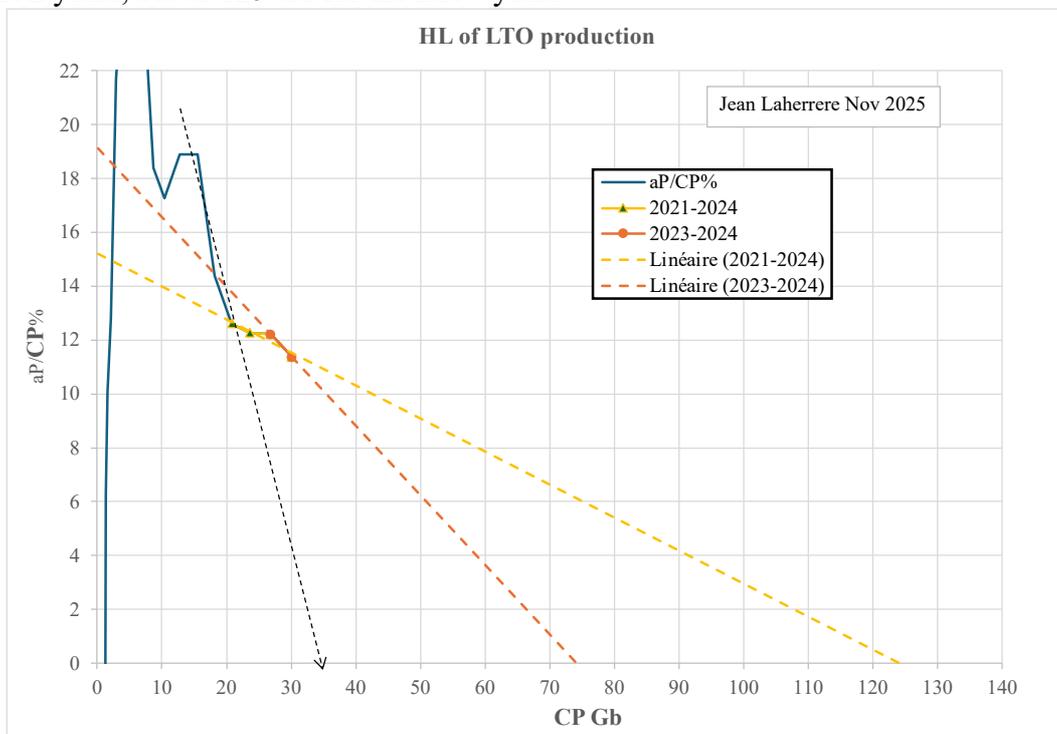


**-LTO**

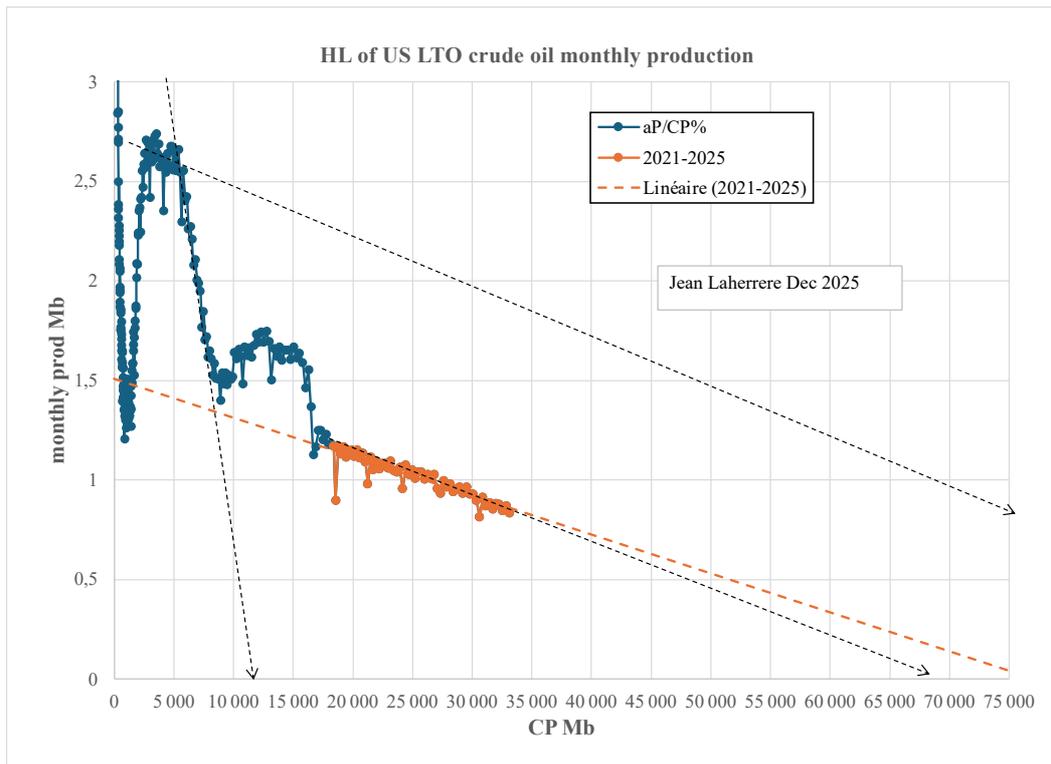
US LTO monthly production is reported by EIA with Permian as the main producer, followed by Bakken and Eagle Ford, showing no sign of peaking!



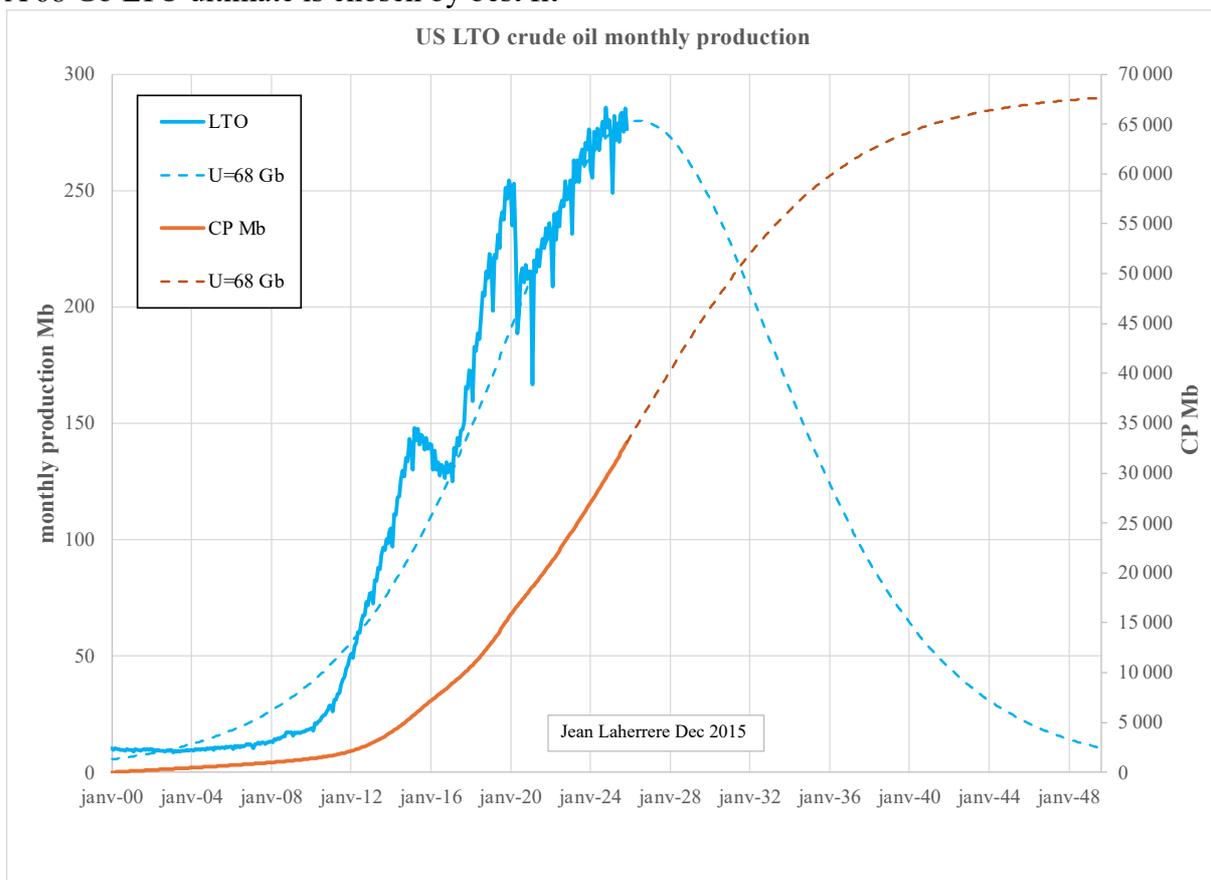
HL of annual LTO production trends towards 73 Gb with a limited vertical scale 0-22% for the last 2 years, but to 125 Gb for the last 4 years



HL of US LTO crude oil monthly production trends towards 68 Gb



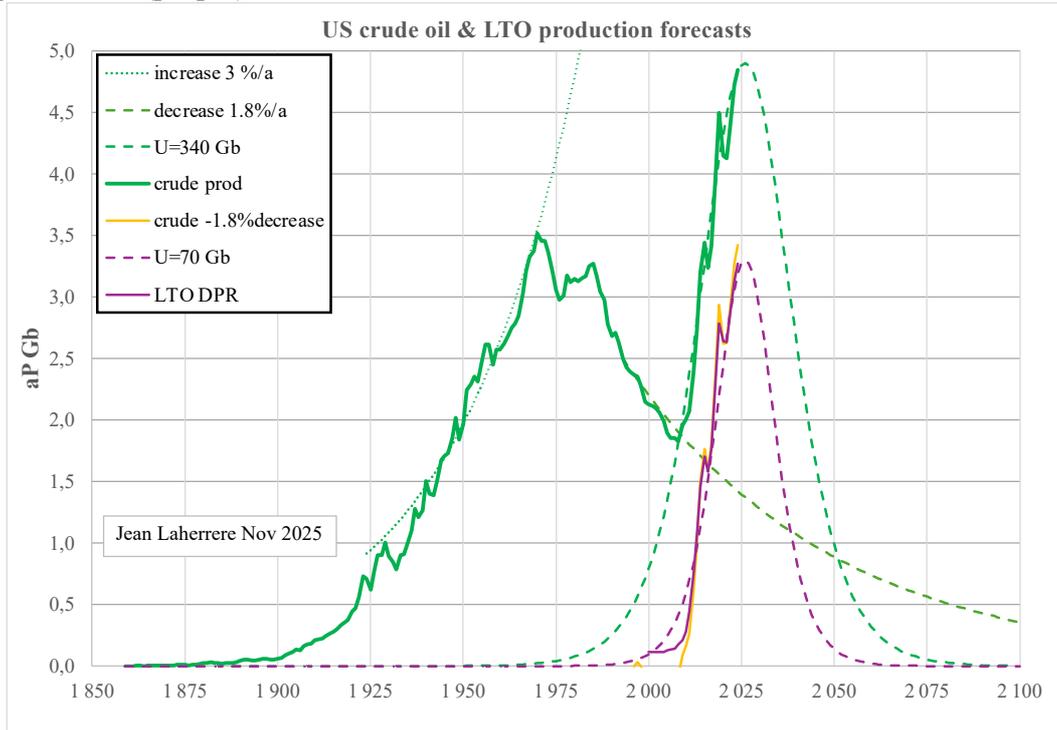
A 68 Gb LTO ultimate is chosen by best fit



A 340 Gb ultimate is chosen for US crude oil production as 70 Gb for LTO, with a peak in 2026

Oil production

LTO production (purple) is close to crude less 1.8%/a decrease

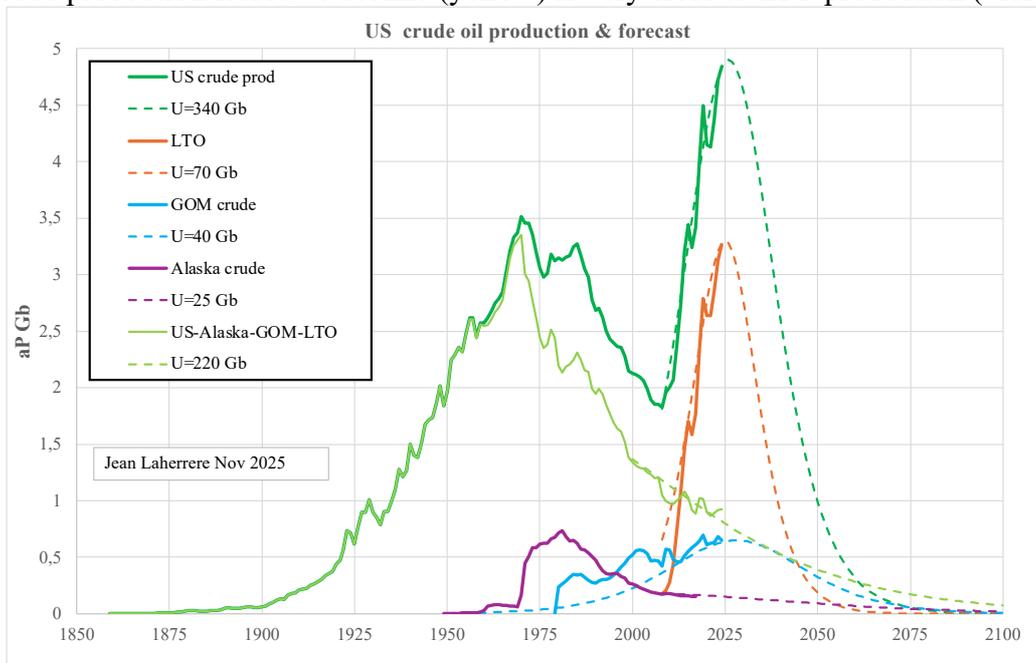


US crude oil production increased by 3%/a from 1935 to 1970. As forecasted in 1956 by King Hubbert US crude oil production peaked first in 1970.

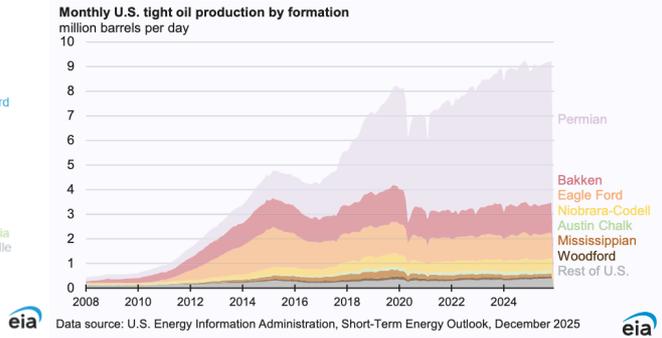
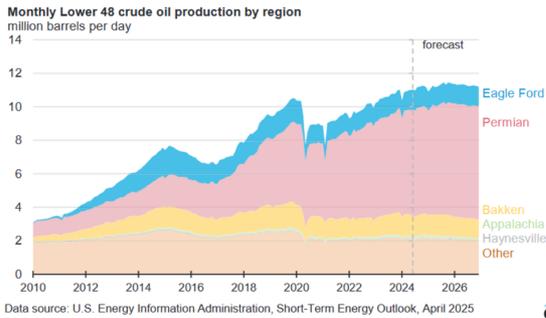
Ultimates are 70 Gb for LTO and 40 Gb for GoM.

US crude oil production decreased by 1.8%/a from 1970 to 2008, but LTO increased sharply since 2008, being 40% over 1970 peak!

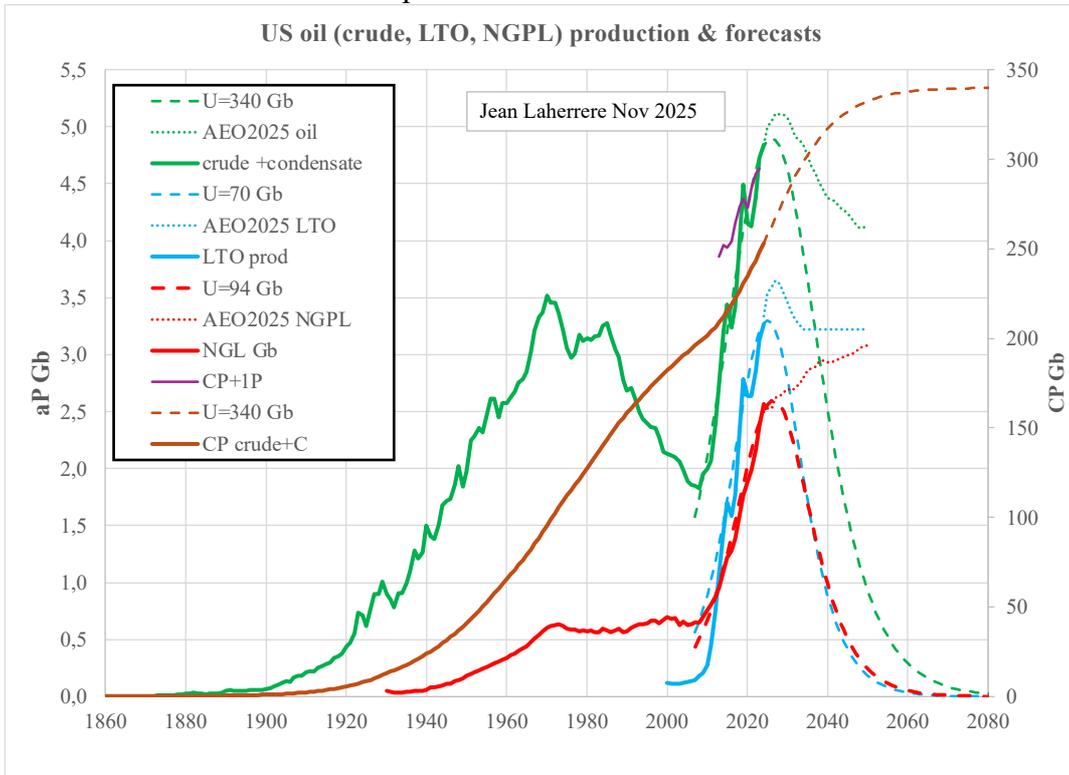
The crude production less 1.8% decline (yellow) is very close to LTO production (violet).



EIA December 2025 graph 2010-2027 on US monthly L48 crude production by region and by formation with a peak in 2025-2026

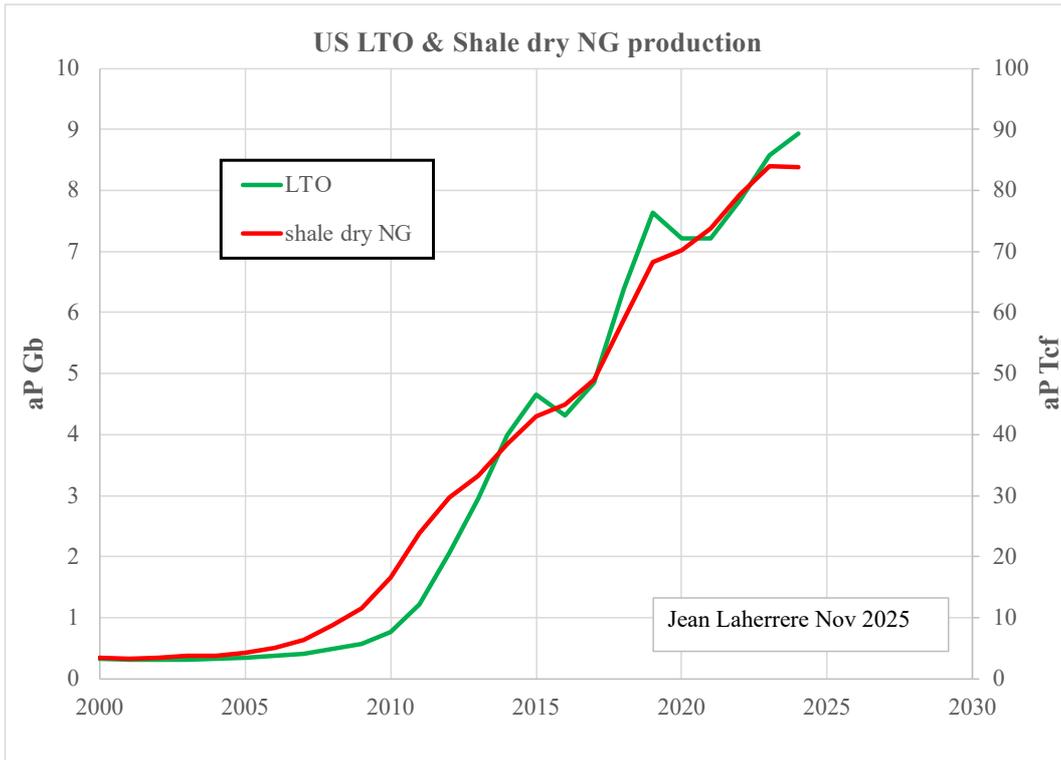


Oil, LTO and NGL production forecast, as AEO 2025  
My 340 Gb ultimate of US crude oil production is not far from CP+1P 2024

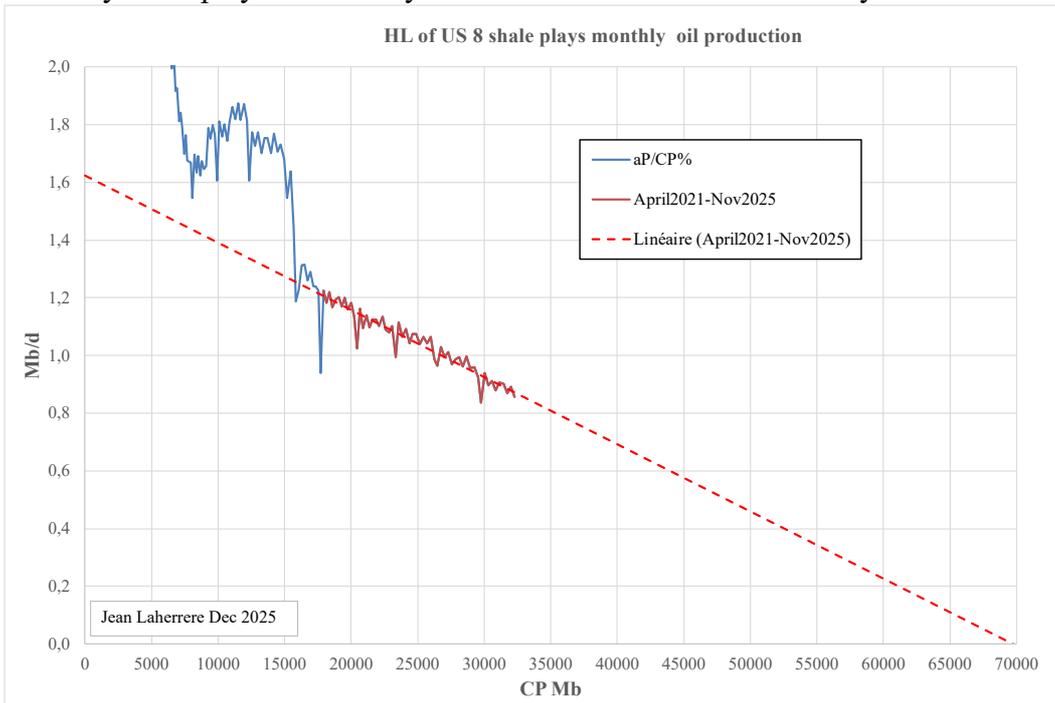


My forecast for oil production (green) is close to AEO25, as for LTO (blue), but not for NGL (red), AEO25 forecasts in 2050 NGL at >3 Gb increasing when my forecast is 0.2 Gb decreasing!  
Quite a difference!

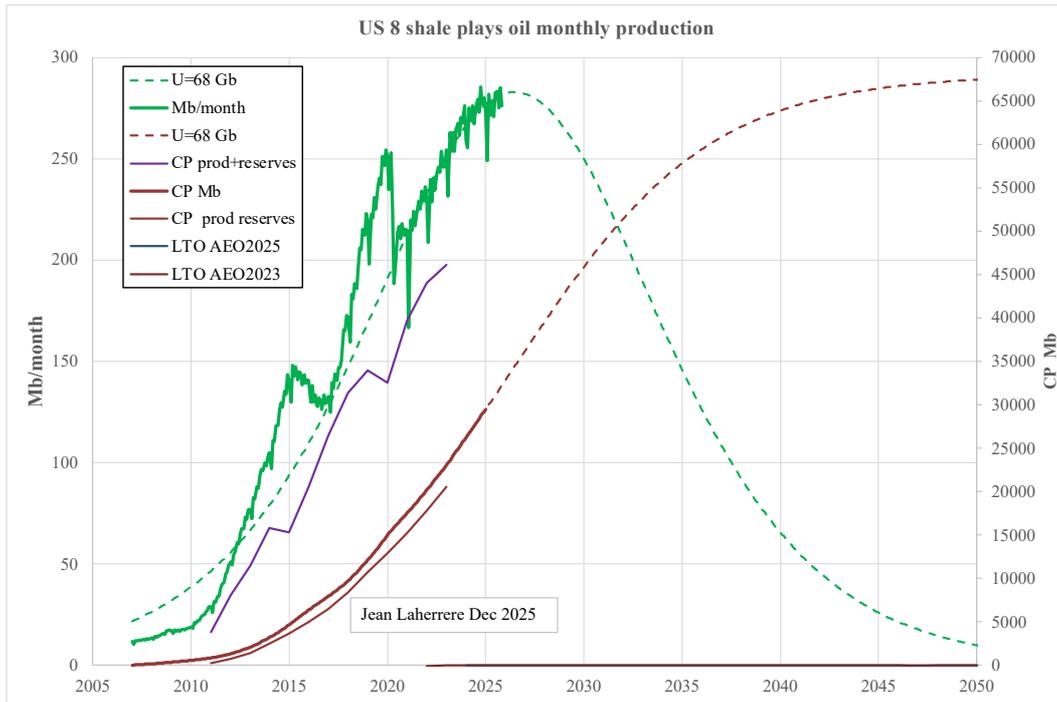
LTO production increase is similar with NG shale production dry NG data is ten times LTO data! US producers put their efforts the same way on oil as on NG! In 2024, oil is increasing when NG is flat



HL of monthly shale plays trends very well towards 70 Gb for the last 4 years:

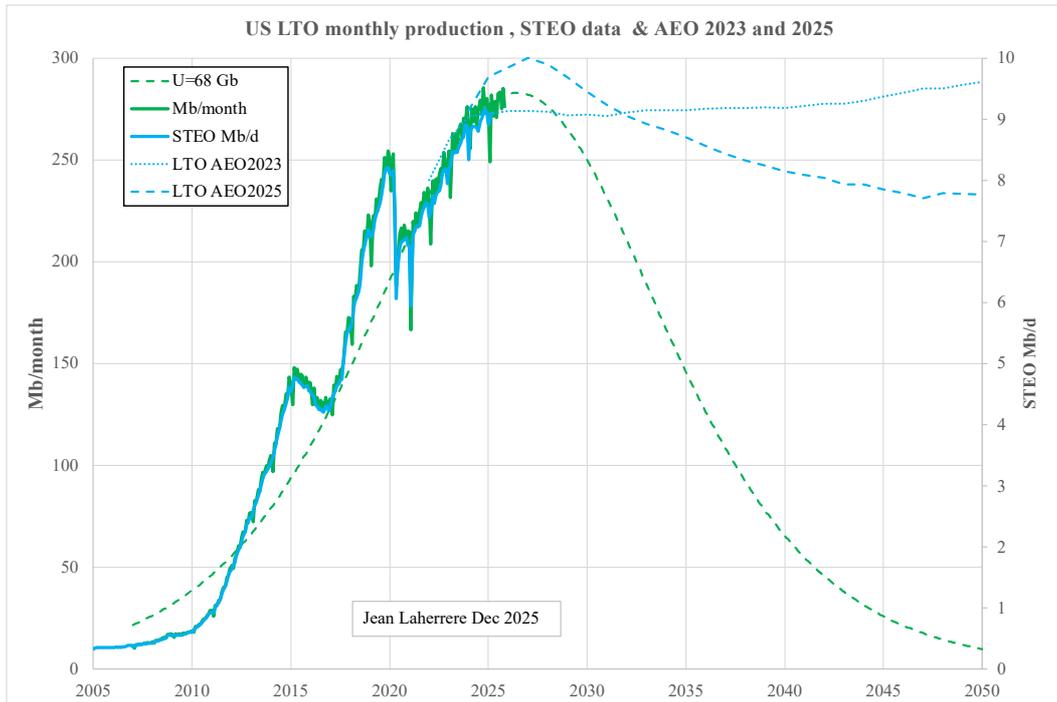


But a best fit gives an ultimate of 68 Gb instead with a peak in end 2025



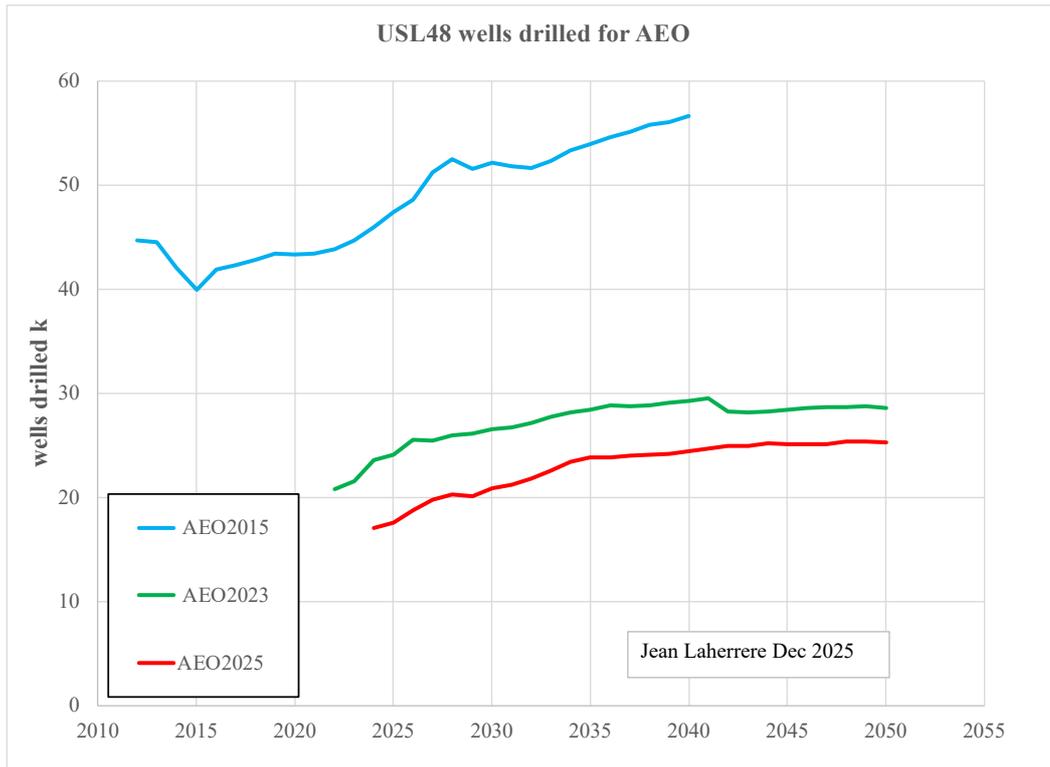
CP+1P is much lower than the 68 Gb ultimate, meaning that 1P reserves are too low!

### Comparison with AEO 2023 & 2025



AEO2025 forecasts the peak in 2027 with a small decline beyond: in 2050 more than 7 Mb/d when I forecast only less than 1 Mb/d! AEO2023 forecast was crazy with peak beyond 2050!

AEO forecast for USL48 drilled wells is decreasing sharply from AEO2015 to AEO2025, the wells peak is beyond 2050 for AEO2025, I wonder where they will find the locations!

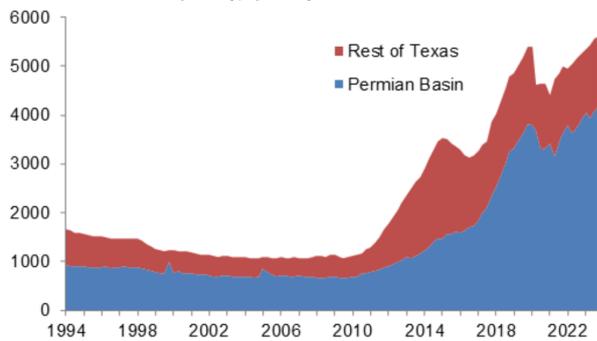


### -Permian formation

<https://www.dallasfed.org/research/energy11/permian#oil> displays Permian oil production in Texas and New Mexico as the rest in the State: Permian is largely the main source!

#### Texas oil production in Permian Basin and rest of state

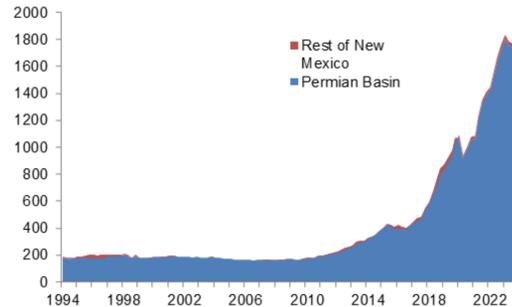
Thousands of barrels per day, quarterly



SOURCES: WellDatabase; Energy Information Administration; calculations by Federal Reserve Bank of Dallas.

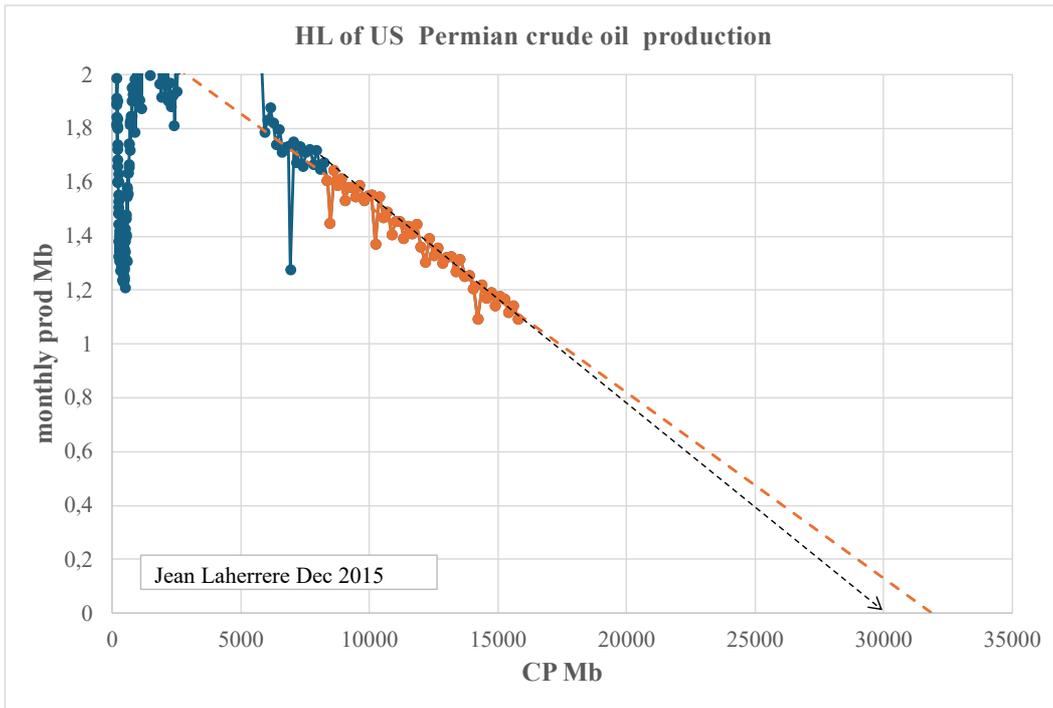
#### New Mexico oil production in Permian Basin and rest of state

Thousands of barrels per day, quarterly

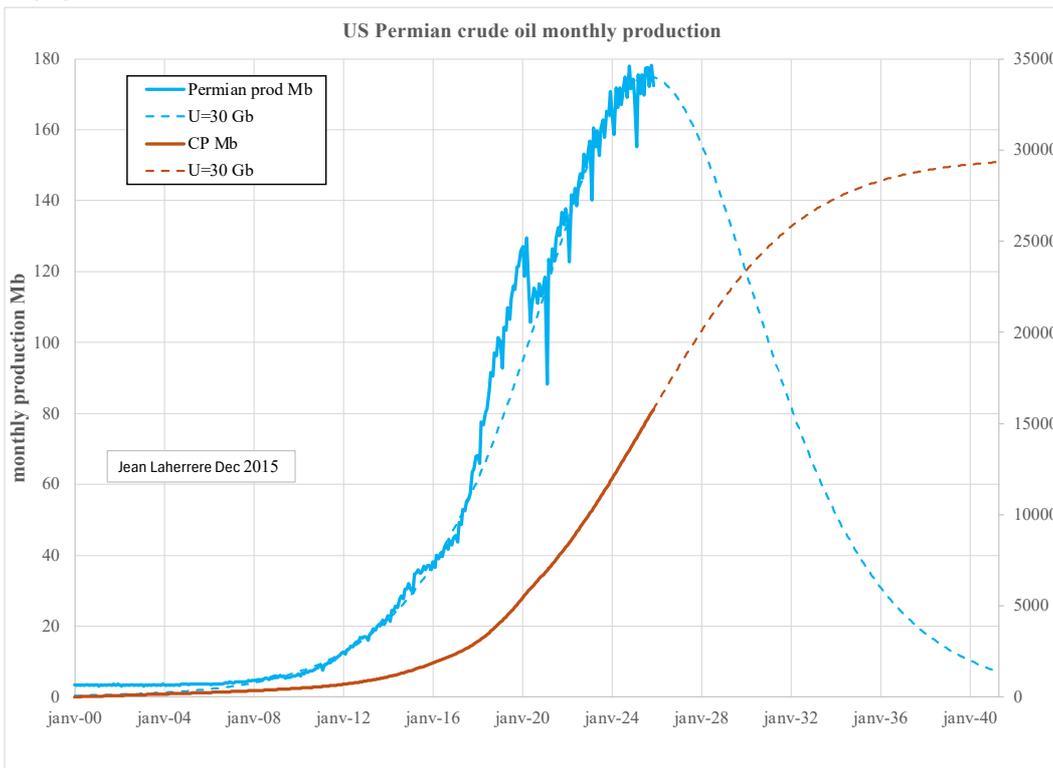


SOURCE: WellDatabase; Energy Information Administration.

HL of Permian crude oil production trends towards 32 Gb

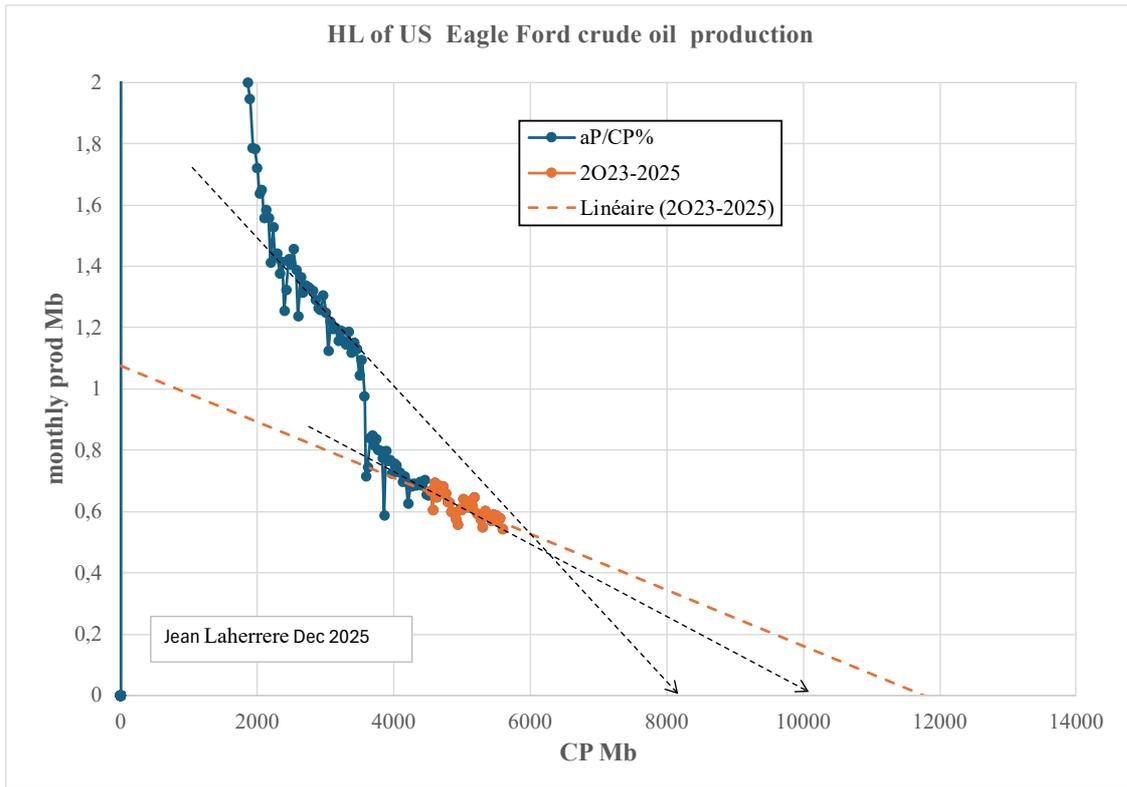


The best fit is displayed for an ultimate of 30 Gb, with also a good fit for 2008-2017 as for 2021-2025

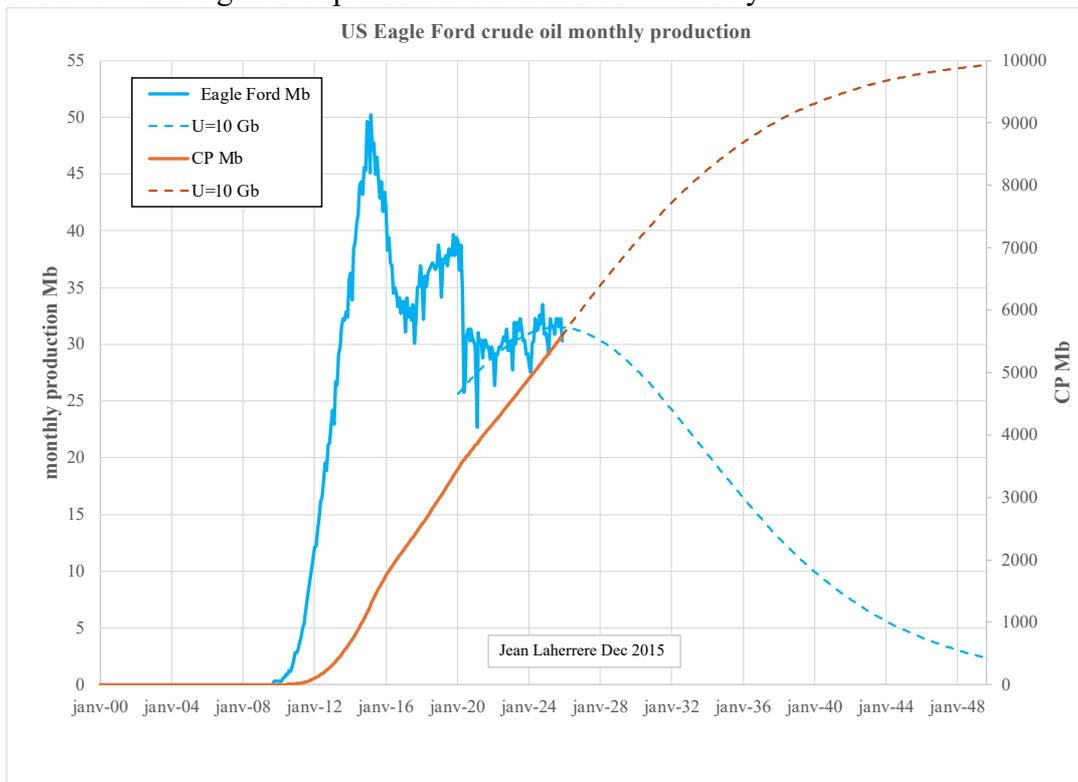


**-Eagle Ford**

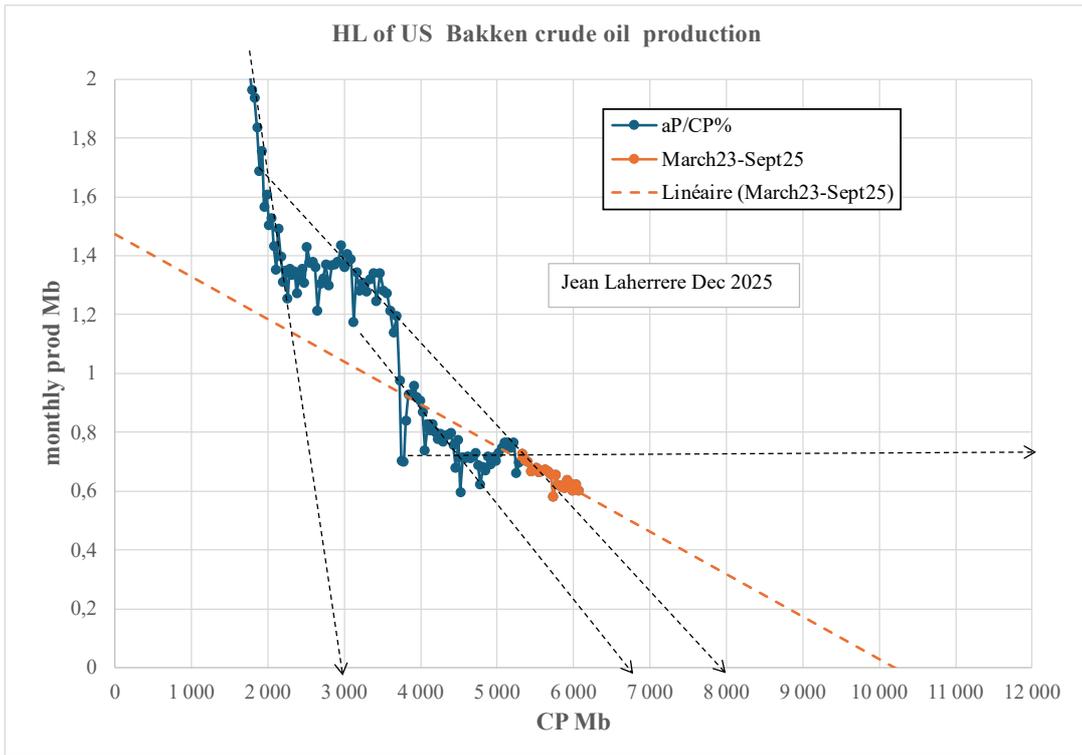
HL of Eagle Ford crude oil production trends towards 12 Gb



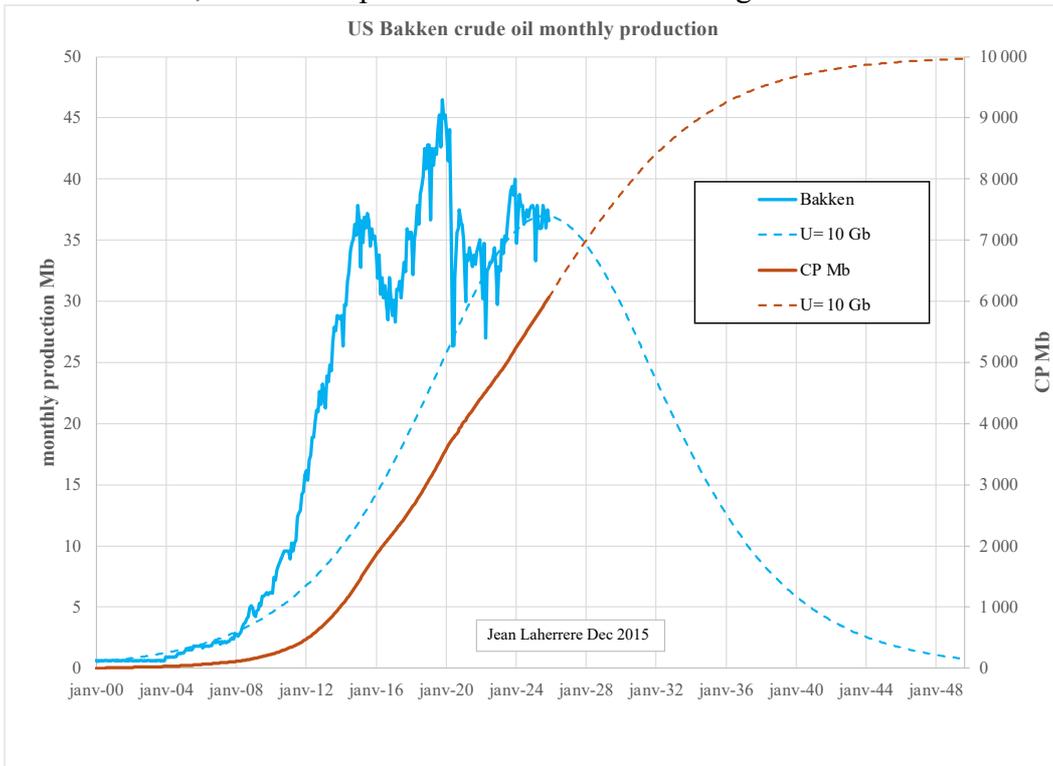
For 10 Gb ultimate Eagle Ford production starts to decline today!



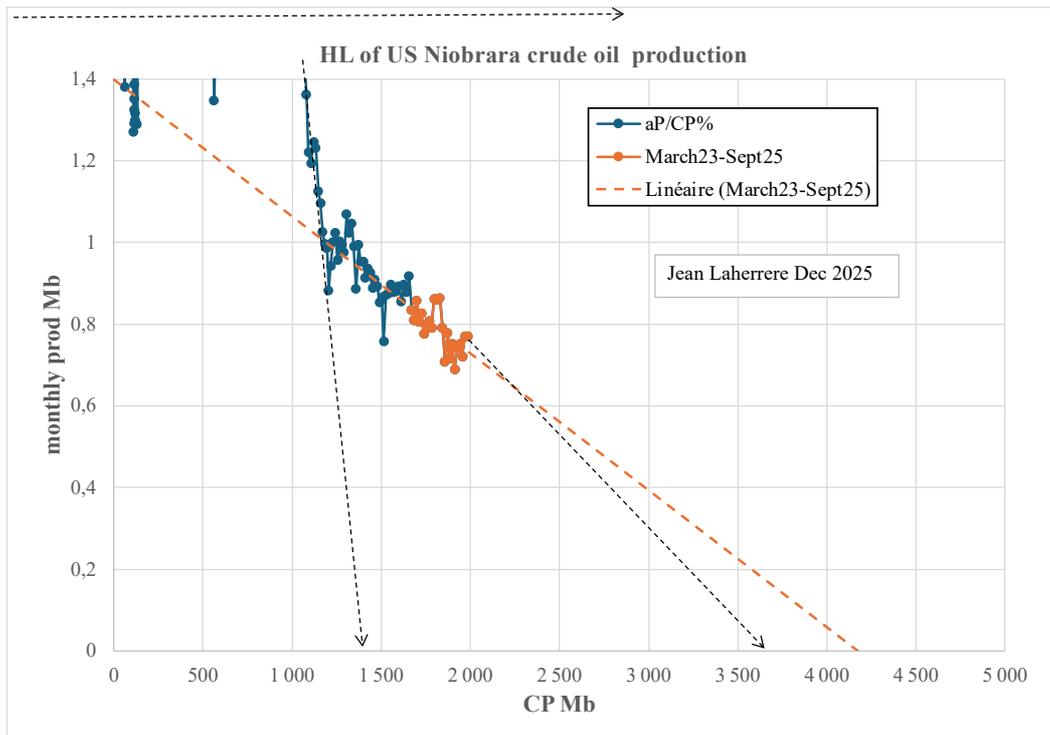
**-Bakken**  
HL of Bakken oil production trends towards 10 Gb



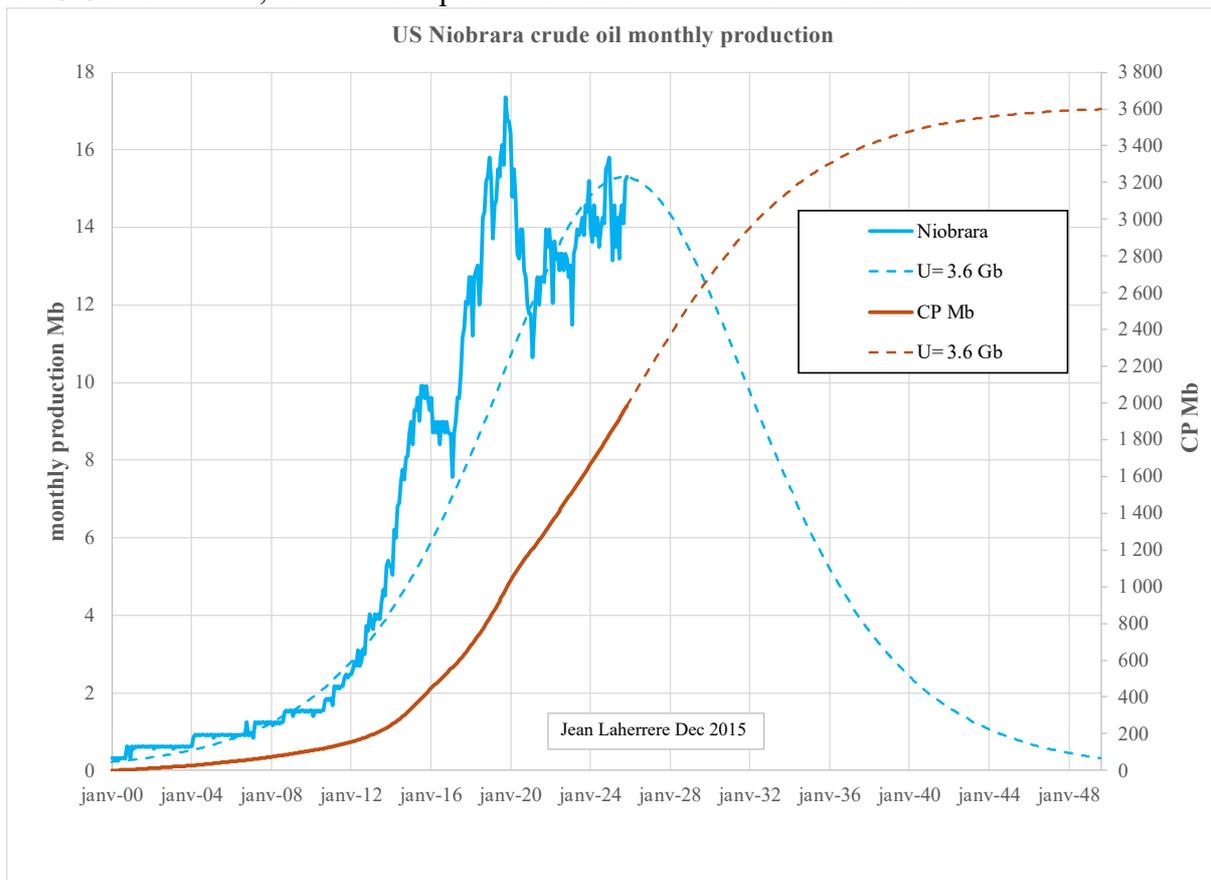
For a 10 Gb ultimate, Bakken oil production will start declining from now!



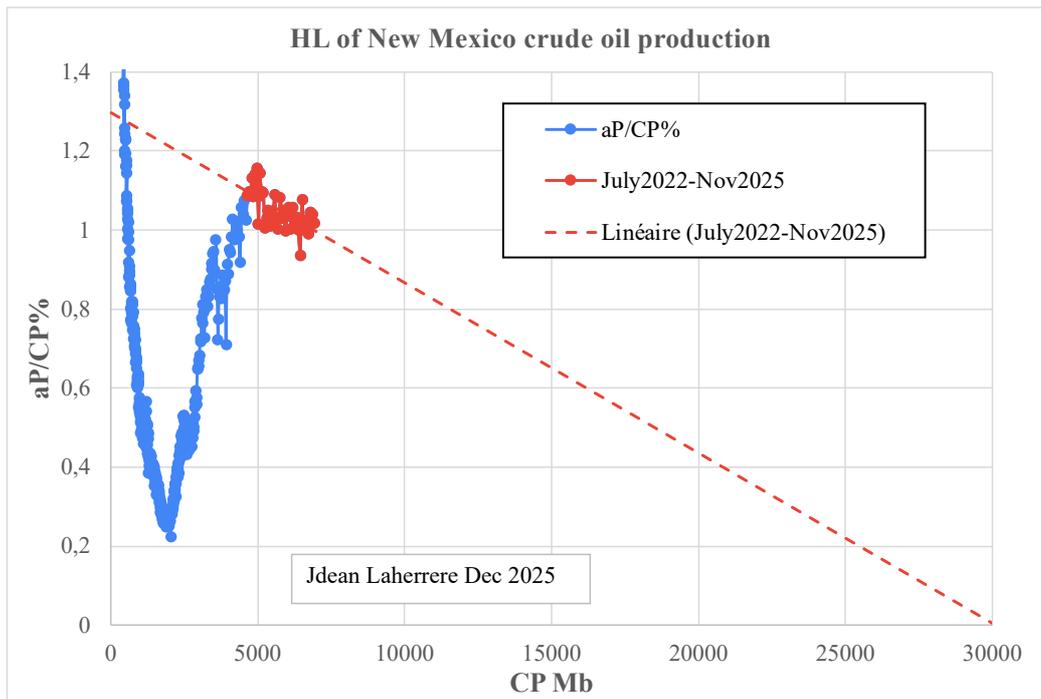
**-Niobrara**  
HL of Niobrara oil production trends towards 4.2 Gb



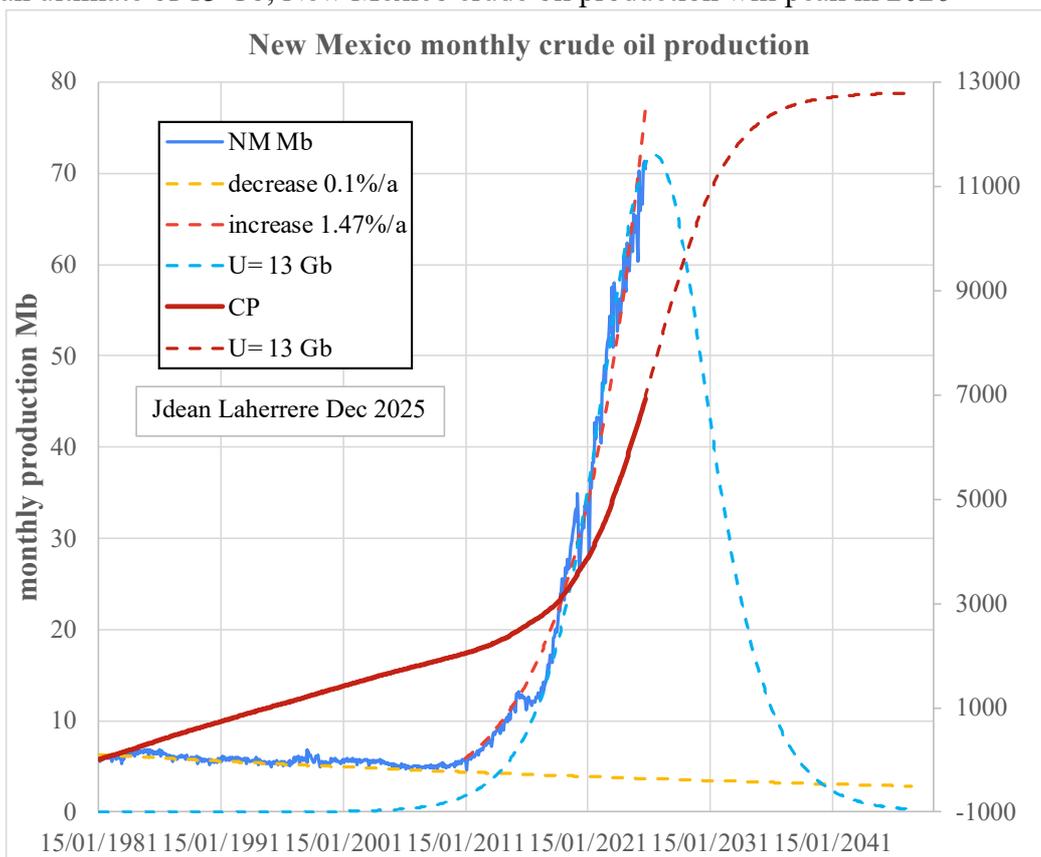
For 3.6 Gb ultimate, Niobrara oil production would decline from now:



**-New Mexico State**  
 HL of New Mexico oil production trends towards 30 Gb



With an ultimate of 13 Gb, New Mexico crude oil production will peak in 2026



New Mexico crude oil production from 1980 to 2010 was declining with a rate of 0.1 %/a. Around 2040 conventional crude oil will be higher than LTO!

**-Gulf of Mexico**

Gulf of Mexico is now Gulf of America for President Trump, then for BOEM Bureau of Ocean Energy Management, what would be after Trump? America is the name of continent as Africa and comes from the founder of the continent Amerigo Vespucci: there are North America, Central America and South America: Gulf of America is meaningless! WorldAtlas.com calls Gulf of Mexico east of Mexico state and Gulf of California west of Mexico state



BOEM is one of the few agencies with UK NSTA, France former BEPH and Norway NPD reporting data by fields and 2P reserves from 2001 to 2019, <https://www.data.boem.gov/Main/FieldReserves.aspx>, which are real data when proven reserves are very far from reality, being mainly financial or political information. Every oil company listed on the US stock market is obliged by the SEC to report only proven reserves! The SEC is guilty by obliging the oil companies to report the wrong proven reserves data. I remind that the aggregation of proven reserves is incorrect: the proven reserve of a country is much more than the sum of fields proven reserves: about the double. Only the aggregation of 2P reserves is correct

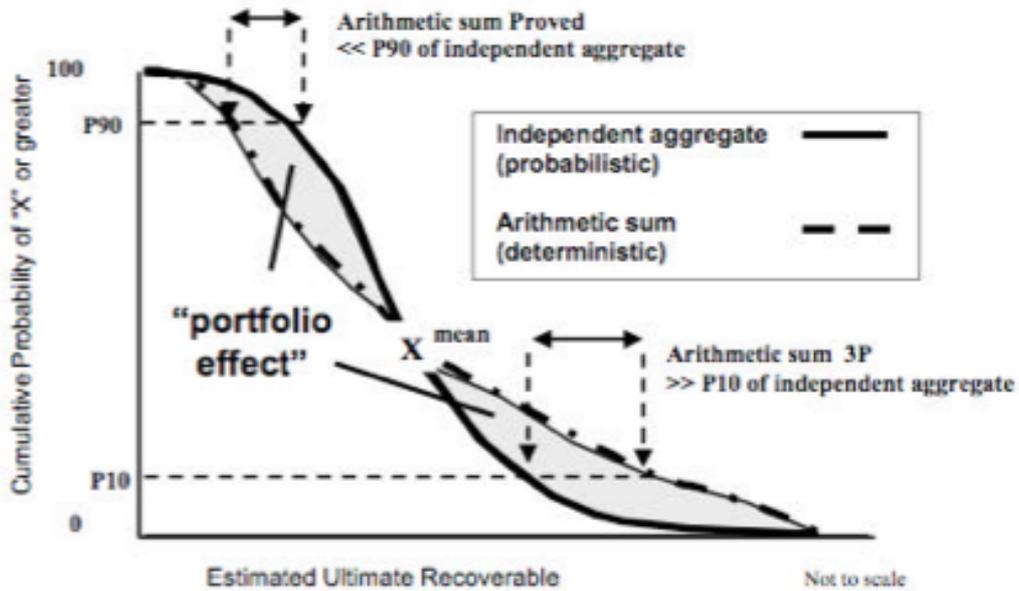
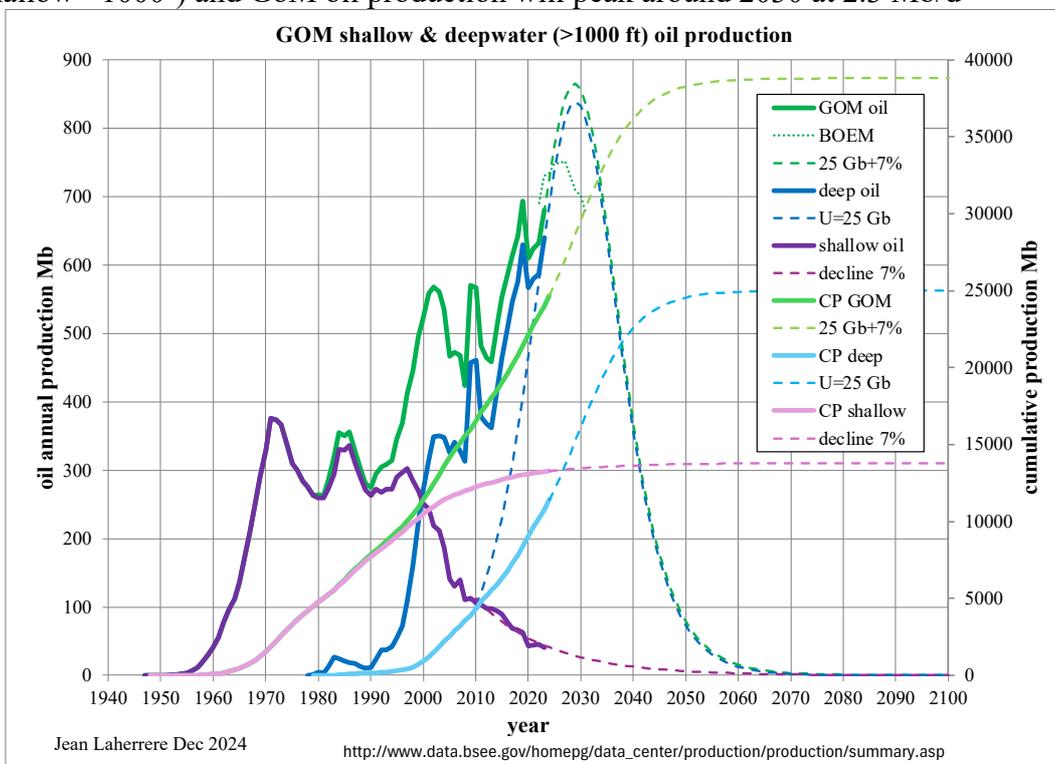


Figure 3-2: Deterministic versus Probabilistic Aggregation

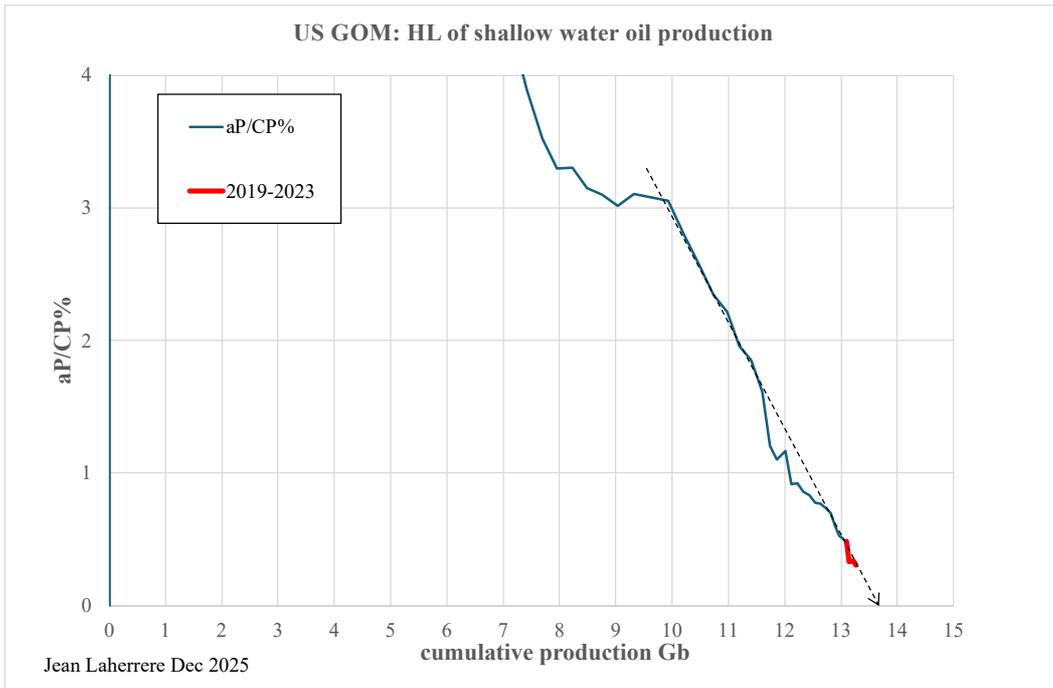
But BOEM 2021-082 reports no data on reserves only geology! BOEM was reporting real data up to 2019, but since 2020 BOEM is drifting to no data!

In 2024, I forecasted that GoM oil ultimate is about 39 Gb (25 Gb for deep <1000' and 14 Gb for shallow <1000') and GoM oil production will peak around 2030 at 2.3 Mb/d

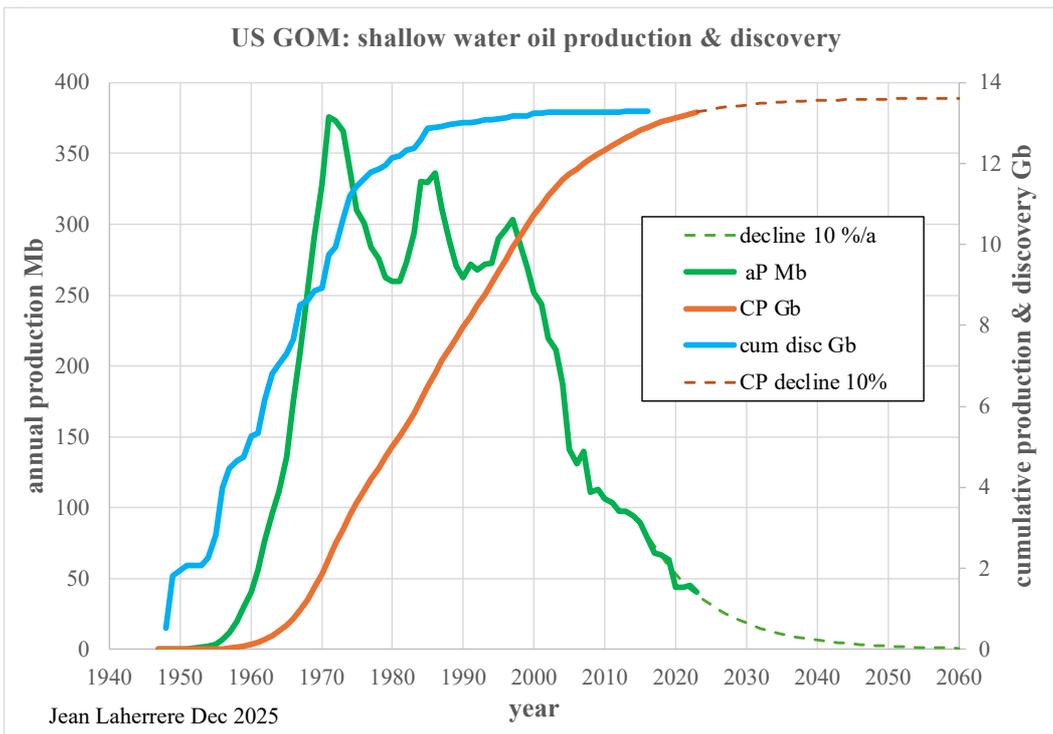


I was too optimistic on the value of the peak at 850 Mb

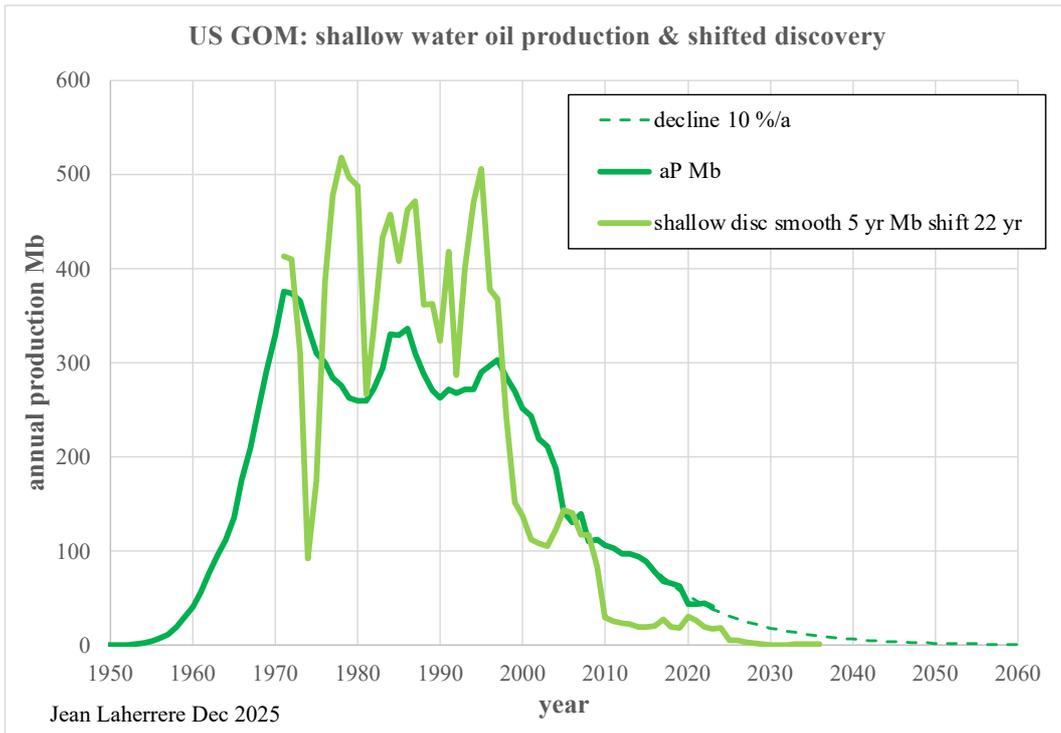
**-shallow water depth <1000 ft**  
 HL of GOM shallow water trends towards 13.5 Gb



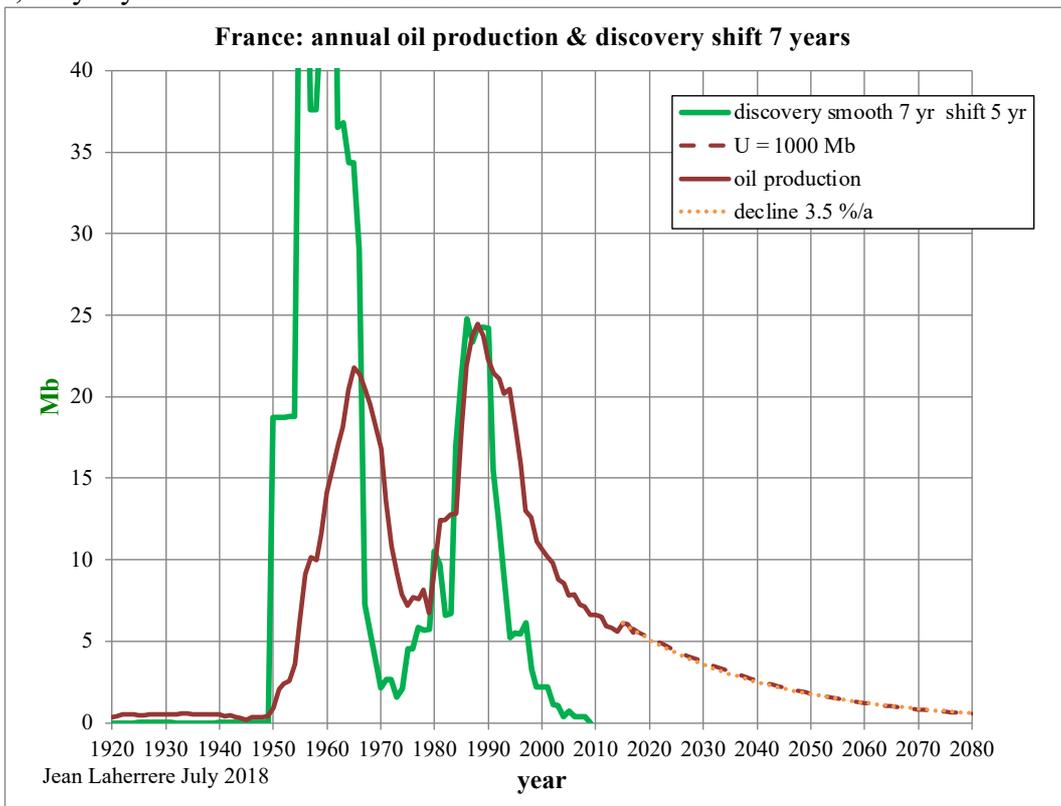
The past shallow production declines 10%/a, a future 10% decline will give an ultimate of 13.5 Gb



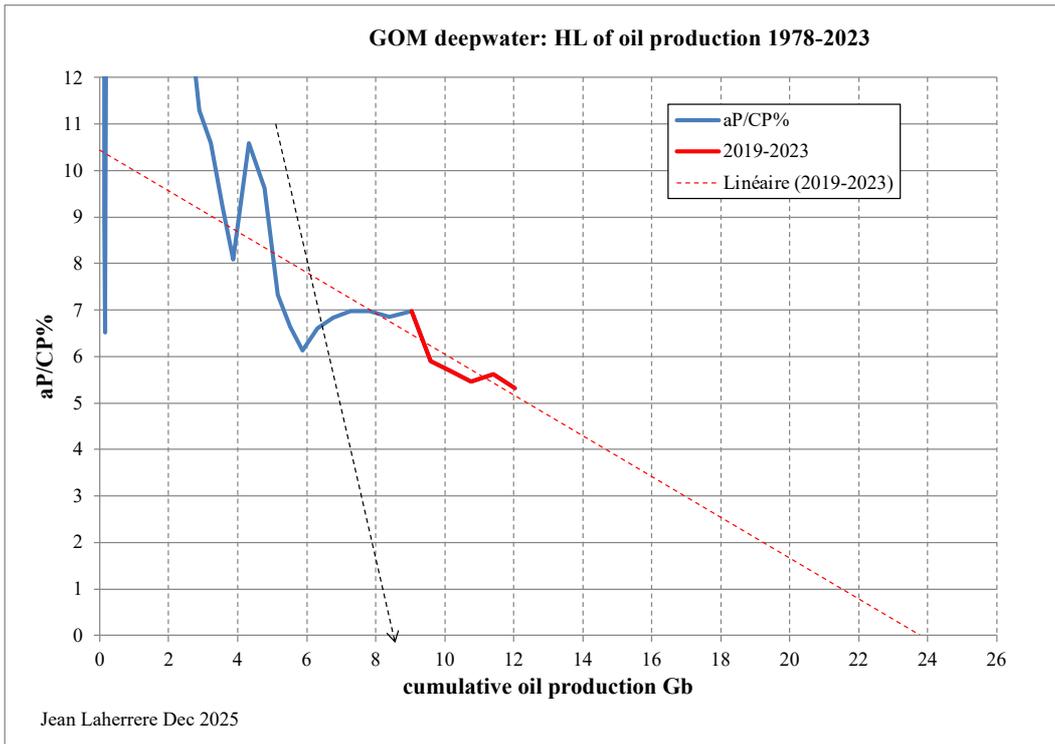
Shallow oil production is compared with shifted discoveries (by 5 years)



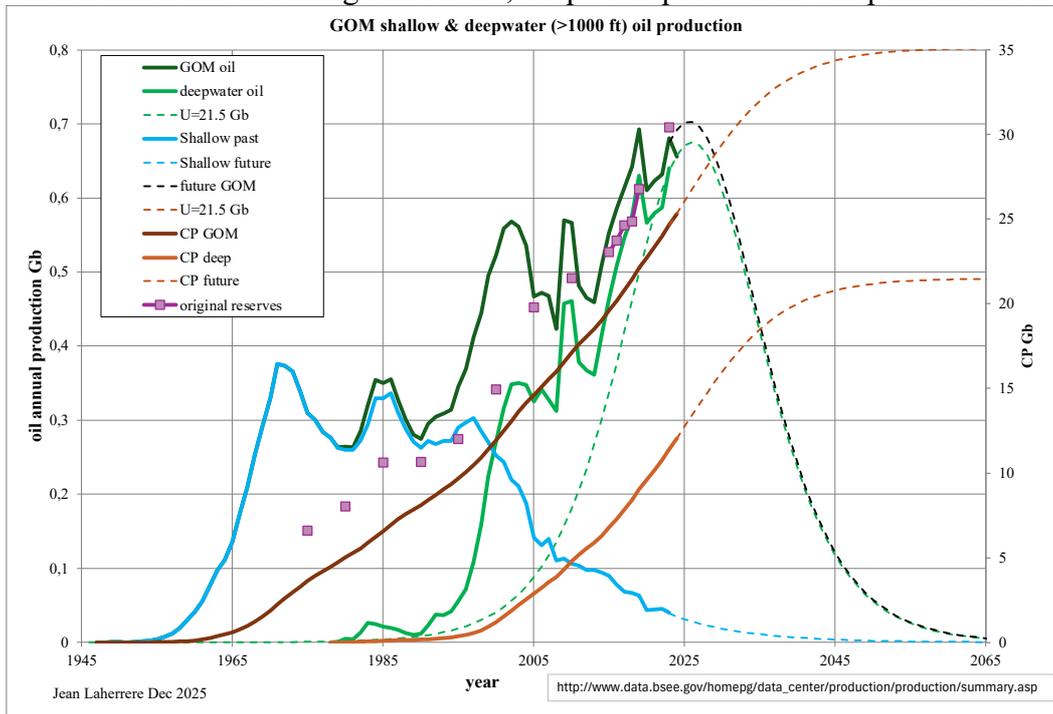
It is a good correlation between annual shallow production and shifted discoveries with a shift of 22 years! In the US the shift is long because of many discoveries but in France the shift is shorter, only 7 years because of few discoveries!



**-deepwater depth >1000 ft**  
 HL of GOM deepwater crude oil production trends poorly towards 24 Gb



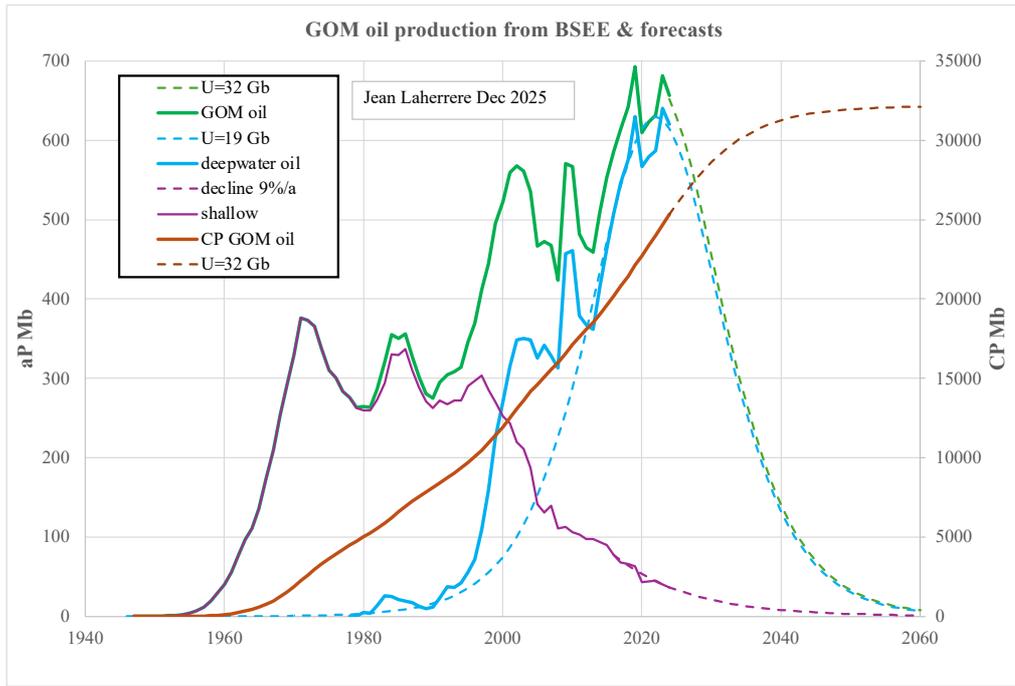
For an ultimate of 35 Gb, GOM crude oil production will peak in 2027, shallow water production is small and declining since 2023, deepwater production will peak around 2026



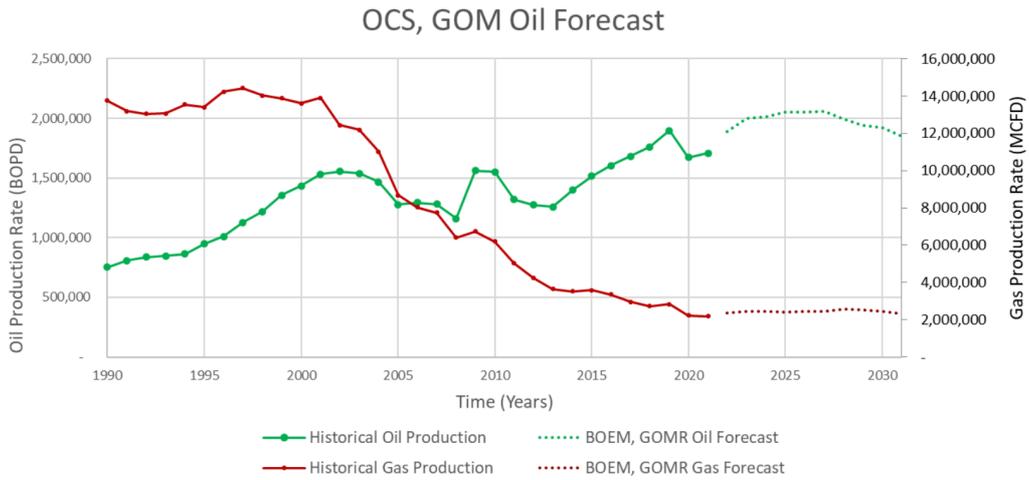
BOEM reports GOM original reserves (purple squares) with over 30 Gb in 2023 compared with an ultimate of 35 Gb!

**-GOM oil forecast**

My other forecast of GOM oil production with an ultimate of 32 Gb is based on deepwater forecast with a peak in 2019 at 700 Mb



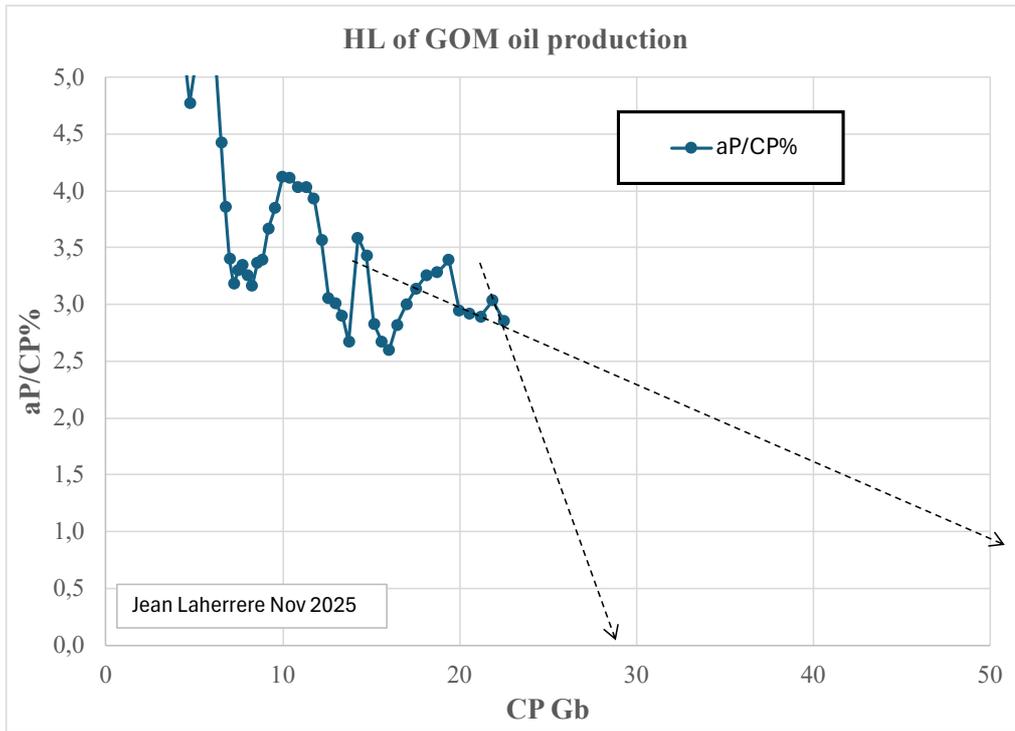
BOEM oil production forecast is BOEM 2022-022 with a peak in 2025-2027 at 2 Mb/d or 730 Mb: [https://www.boem.gov/sites/default/files/documents/regions/gulf-mexico-ocs-region/US OCS GOMR oil and Gas Production Forecast 2022-2031.pdf](https://www.boem.gov/sites/default/files/documents/regions/gulf-mexico-ocs-region/US%20OCS%20GOMR%20oil%20and%20Gas%20Production%20Forecast%202022-2031.pdf)



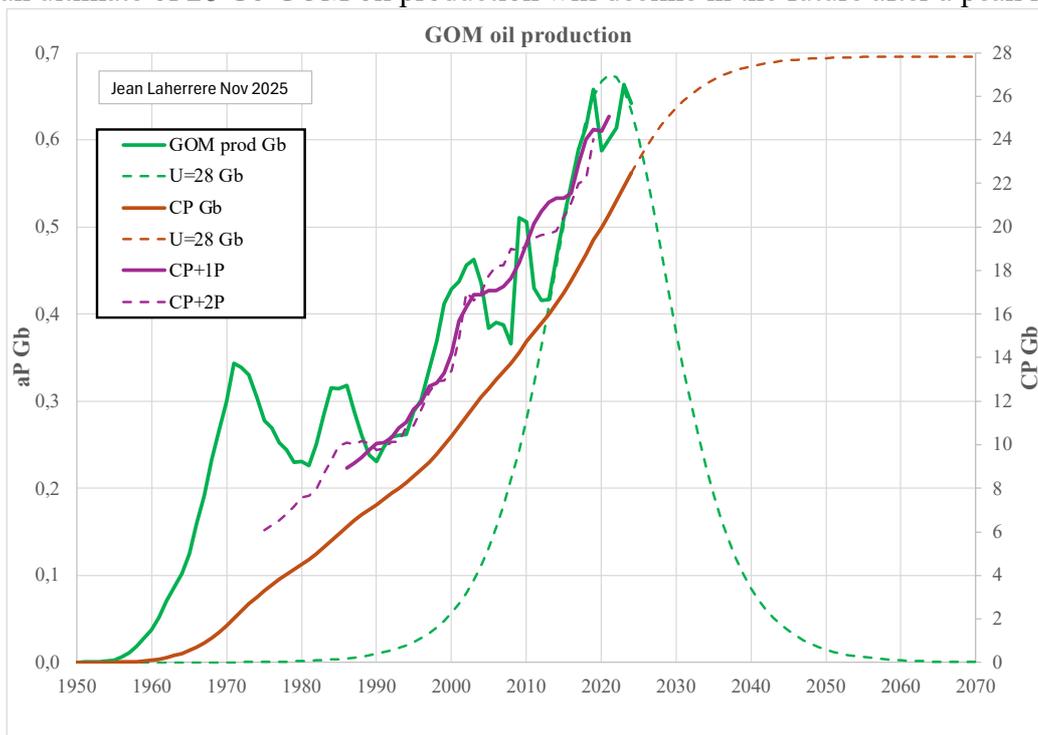
**Figure 1: BOEM, GOMR Oil & Gas Forecast, 2022-2031**

BOEM peak 2025-2027 at 2 Mb/d or 730 Mb is higher than mine being in the past in 2019 at 700 Mb!

My estimate from the total GOM oil production is slightly different  
 HL of GOM production trends very poorly well over 50 Gb or towards 30 Gb for the last 2 years



With an ultimate of 28 Gb GOM oil production will decline in the future after a peak in 2023



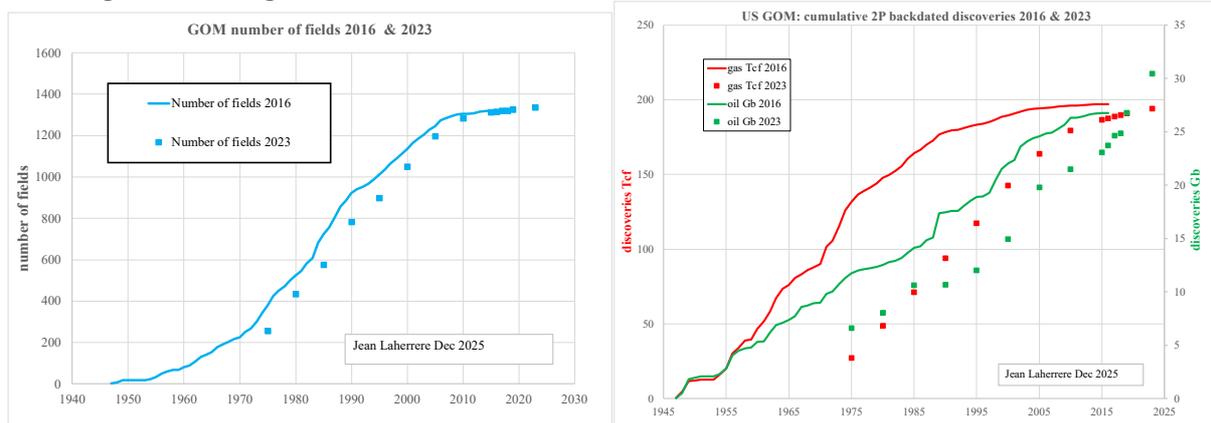
CP +2P is close to CP+1P, it should be higher!

BOEM forecasts (page 13) a peak in 2026 at 2 Mb/d for oil and a flat production for NG:

BOEM reports <https://www.boem.gov/factsheet/2025-estimated-oil-and-gas-reserves-report-gulf-america-ocs-region> at end 2019 CP at 24.66 Gb and 194.02 Tcf with original reserves of 30.43 Gb and 201.17 Tcf

Estimate	OIL (Bbbl)	Gas (TCF)	BOE (Bbbl)
<b>Original Reserves:</b>			
<i>Previous Estimate, as of 12/31/2019</i>	26.77	197	61.83
Reserves from Fields Added 2020-2023**	0.52	0.49	0.60
Revisions from Ongoing/Daily Reservoir Maintenance 2020-2023 *	3.14	3.68	3.79
<b>Estimate, as of 12/31/2023</b>	<b>30.43</b>	<b>201.17</b>	<b>66.22</b>
<b>Cumulative Production:</b>			
<i>Previous Estimate, as of 12/31/2019</i>	22.12	190.9	56.09
Production during 2020-2023	2.54	3.12	3.09
<b>Estimate, as of 12/31/2023</b>	<b>24.66</b>	<b>194.02</b>	<b>59.18</b>
<b>Remaining Reserves:</b>			
<i>Previous Estimate, as of 12/31/2019</i>	4.65	6.10	5.74
Reserves from Fields Added 2020-2023**	0.52	0.49	0.60
Revisions from Ongoing/Daily Reservoir Maintenance 2020-2023 *	3.14	3.68	3.79
Production during 2020-2023	-2.54	-3.12	-3.09
<b>Estimate, as of 12/31/2023</b>	<b>5.77</b>	<b>7.15</b>	<b>7.04</b>

The big problem is that GoM data changes with time and authors: the number of fields discovered in the GOM changes between 2016 and 2023: reserves of fields change with time but also the dates of discovery! It is very disappointing! New authors change data, wishing to be recognized! The goal is more fame than truth!



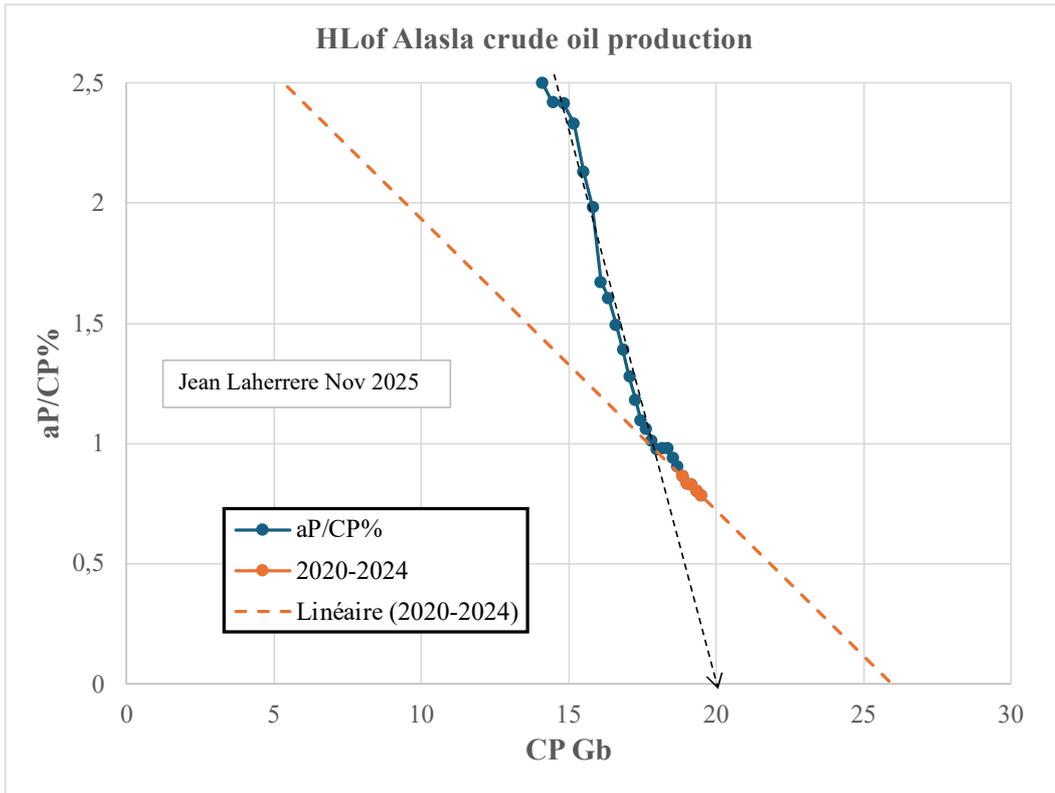
It is then impossible to get reliable data!

It is very disappointing

With 2016 data cumulative discoveries (creaming curves) were almost flat, guessing few future discoveries, with 2023 data (dots) it is more encouraging!

### -Alaska oil

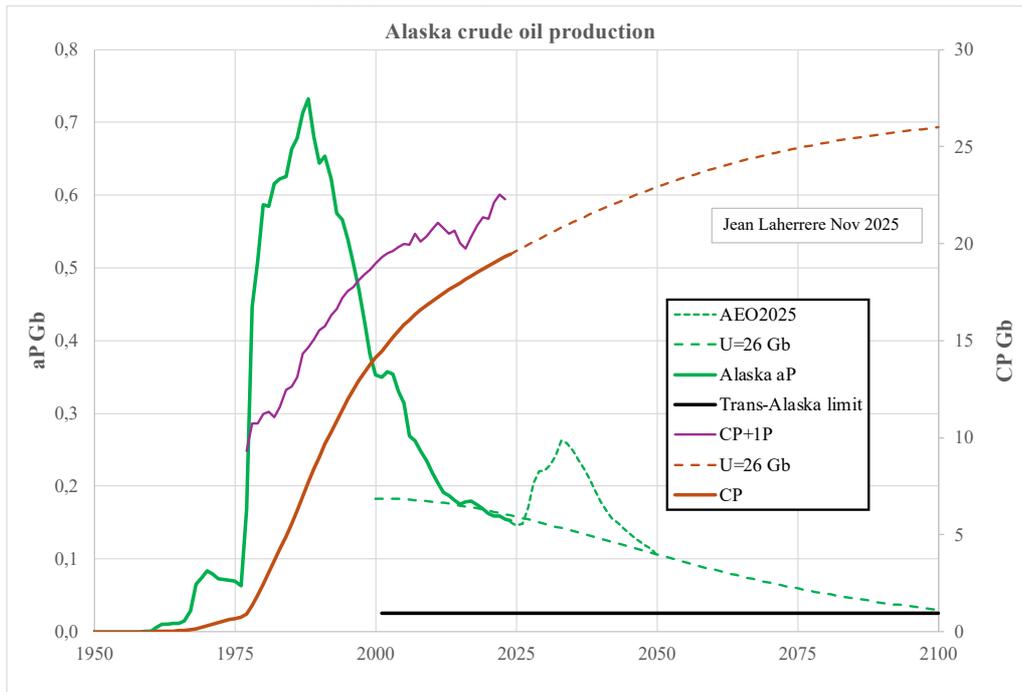
HL of Alaska crude oil production 2020-2024 trends towards 26 Gb for the last 5 years



Alaska crude oil production displays a sharp increase from 1976 to 1980 and a less decrease 1991 to 2012: it is not symmetrical, contrary to USL48, because the small number of fields in Alaska.

For an ultimate of 26 Gb, Alaska crude oil production could be produced until over 2100, but its production will be limited by the life of Trans-Alaska pipeline starting in 1977, because the flow could stop because of freezing when the flow is too little as the pipeline is built over permafrost and climate warming could be a problem!

The minimum is estimated at 70 000 b/d or 0.025 Gb/a



Trans-Alaska pipeline could stop the flow in 2100 as being too low (too cold) to keep the pipeline running!

EIA Alaska oil reserves CP+1P is below the 26 Gb ultimate

BOEM reports for Alaska OCS = offshore holds only 24.69 Gb and 124.03 Tcf

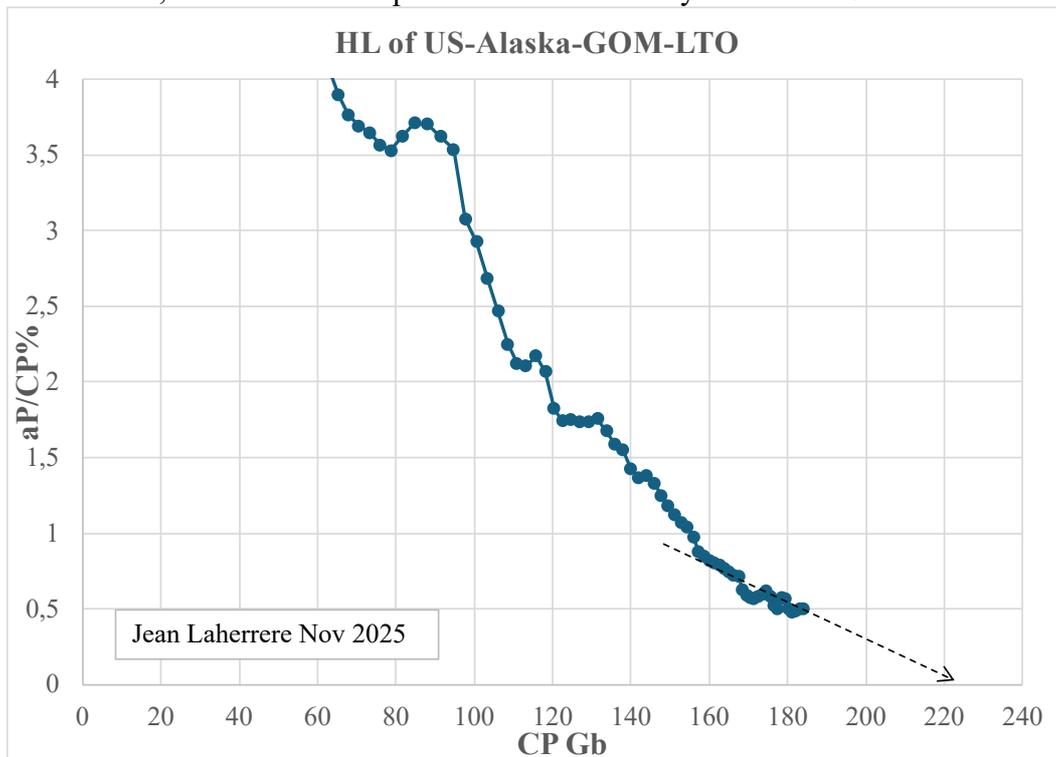
#### Key Regional Information

- **Conventional Energy:** The Alaska OCS is estimated to hold 24.69 billion barrels of oil, and 124.03 trillion cf of natural gas.

These 5 significant digits for Alaska reserves look suspicious! Only 2 or 3 significant digits should be used! Furthermore, it is ambiguous to be remaining reserves or original reserves

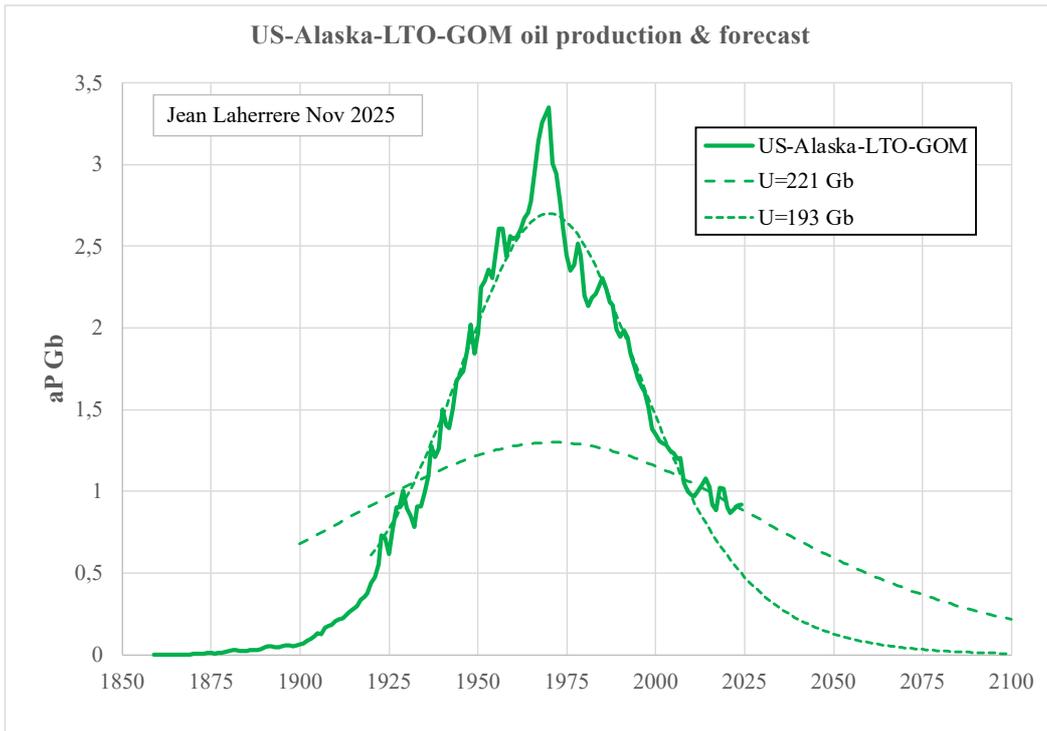
### -US less Alaska, GoM & LTO oil production

HL of less Alaska, GoM & LTO oil production trends fairly towards 220 Gb

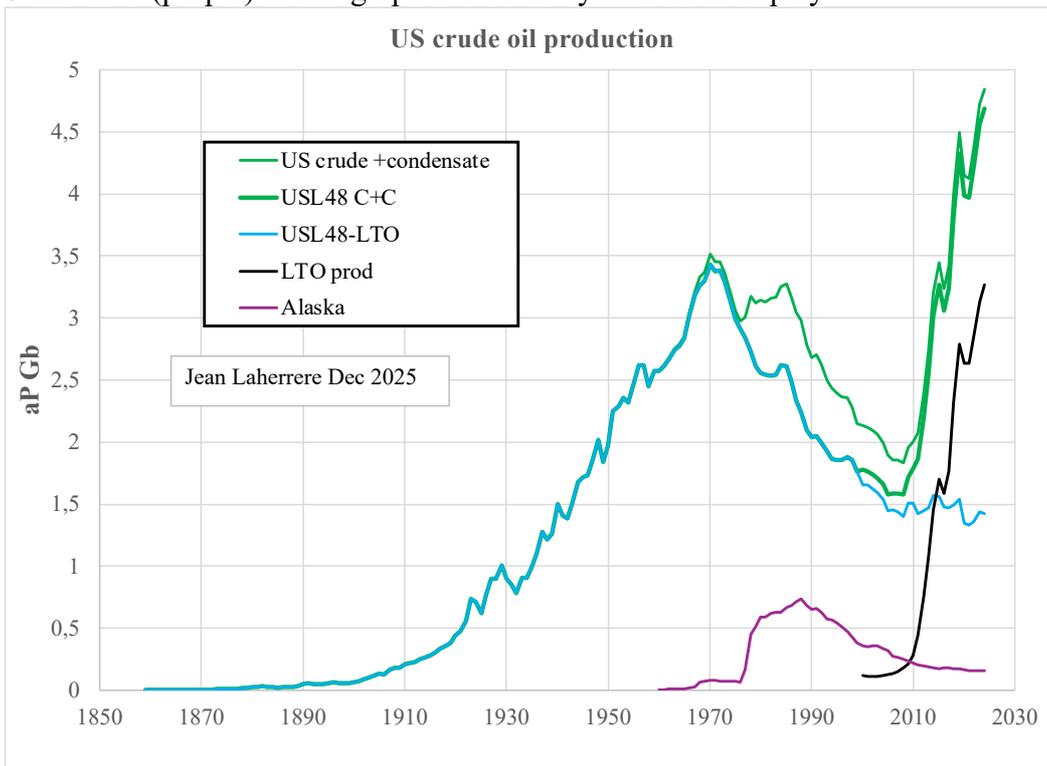


Despite a sharp peak, far from a smooth Hubbert peak, **the symmetry of US less Alaska+GoM+LTO production is amazing** and confirms my modeling assumption described above: a modeling of 221 Gb is displayed, showing that the new fracking for LTO is also effective on the conventional oil reservoirs.

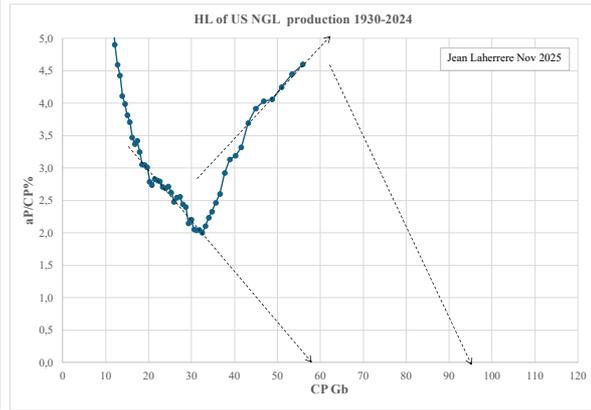
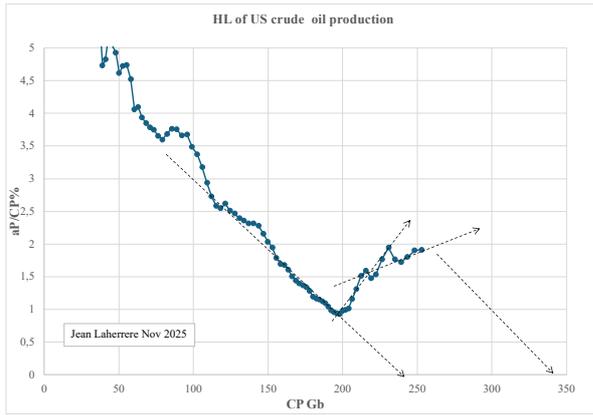
A modelling of 193 Gb is also displayed for the production before 2008 which is the start of LTO fracking. This 193 Gb is close to the 1956 King Hubbert assumption of 200 Gb (together with also 150 Gb!).



USL48 less LTO (purple) in this graph is a better symmetrical display



**-US crude oil & NGL production**  
HL of crude as NGL production trend towards infinite, being useless!

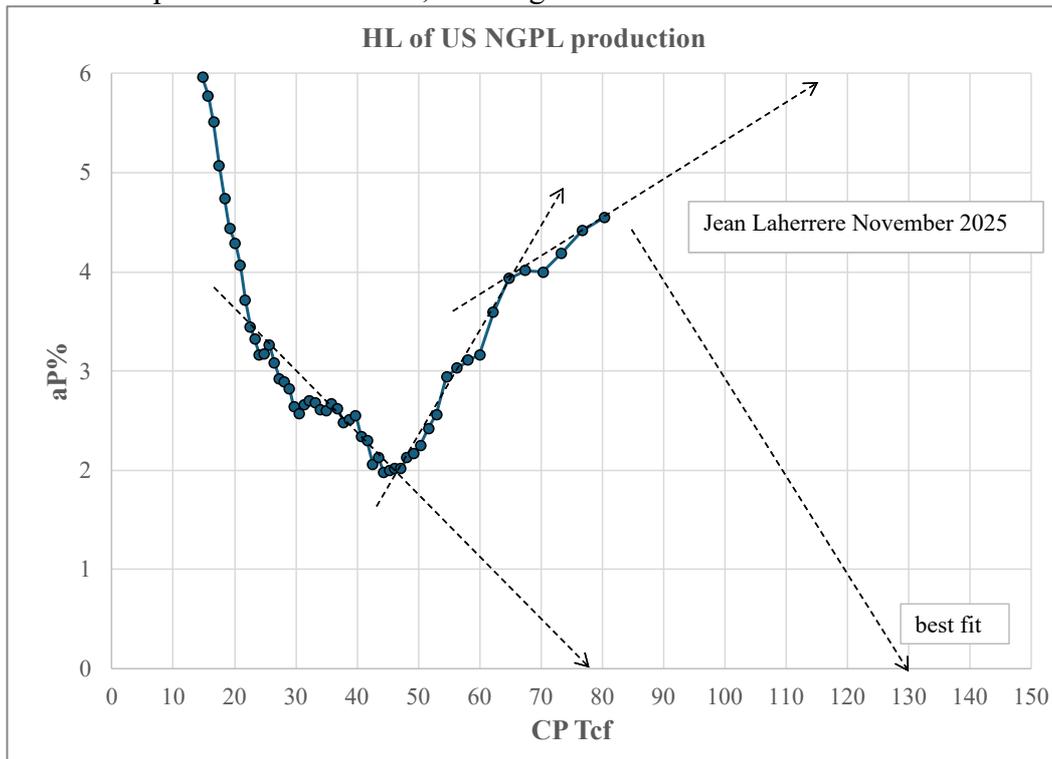


Another approach I use is to estimate future production from a graph of past production with the assumption of symmetry (future decline will be the same as past increase) due to the “law of large numbers” with several thousands of US oil producers (9000 from IPAA) and US oilfields (>30 000 in 1989 from Ivanhoe & Leckie) allows to model past production and to estimate ultimates. This “best fit” technique is a good way to model future production, but is likely to be contradicted in future if production policy changes, in particular with oil price!

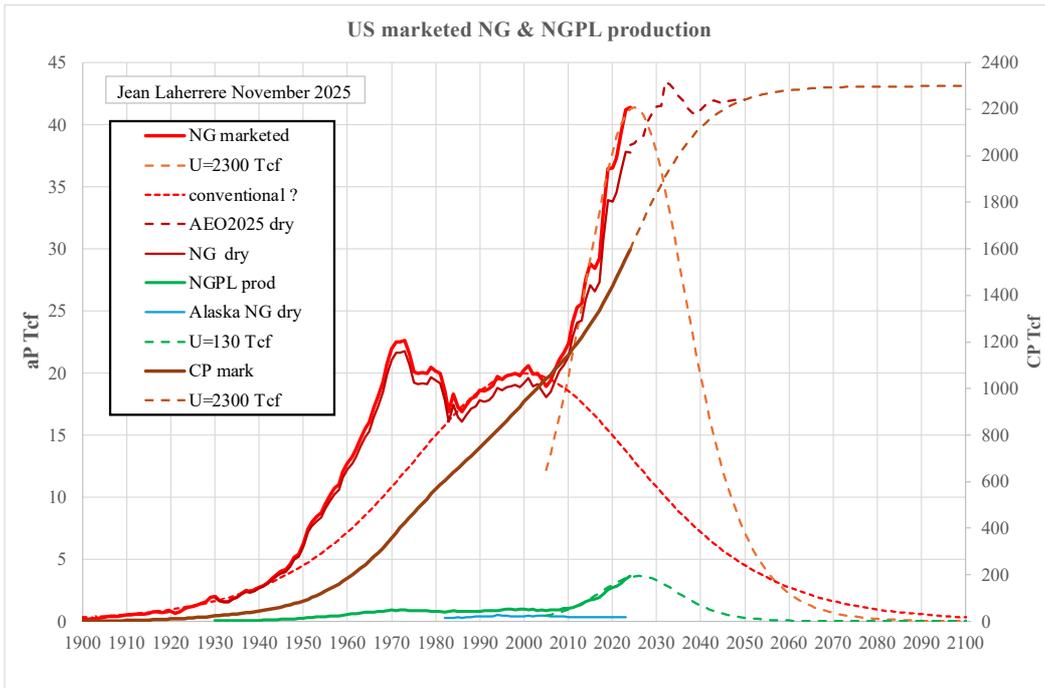
**-NGPL**

NGPL increased sharply in 2008 as shale gas production contains more liquids than conventional gas!

HL of US NGPL production is useless, trending towards infinite!

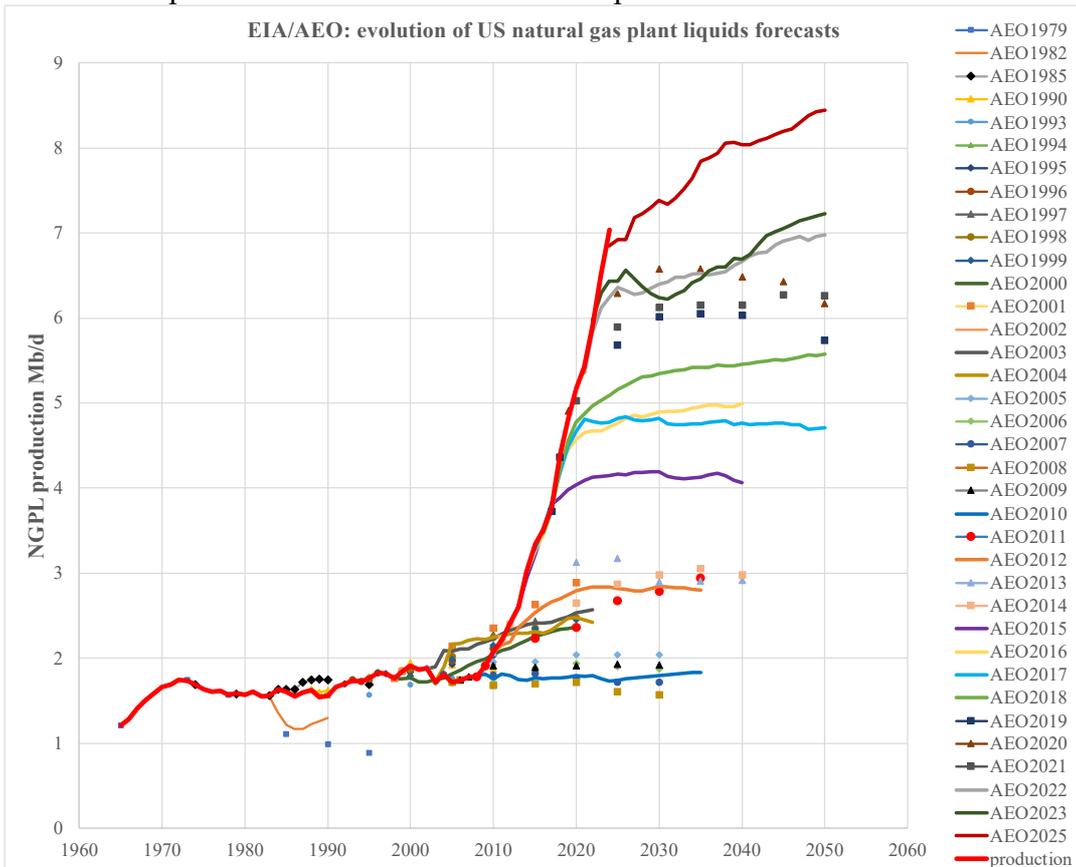


An ultimate of 130 Tcf is estimated for NGPL production by best fitting!  
 NGPL production is compared with NG marketed



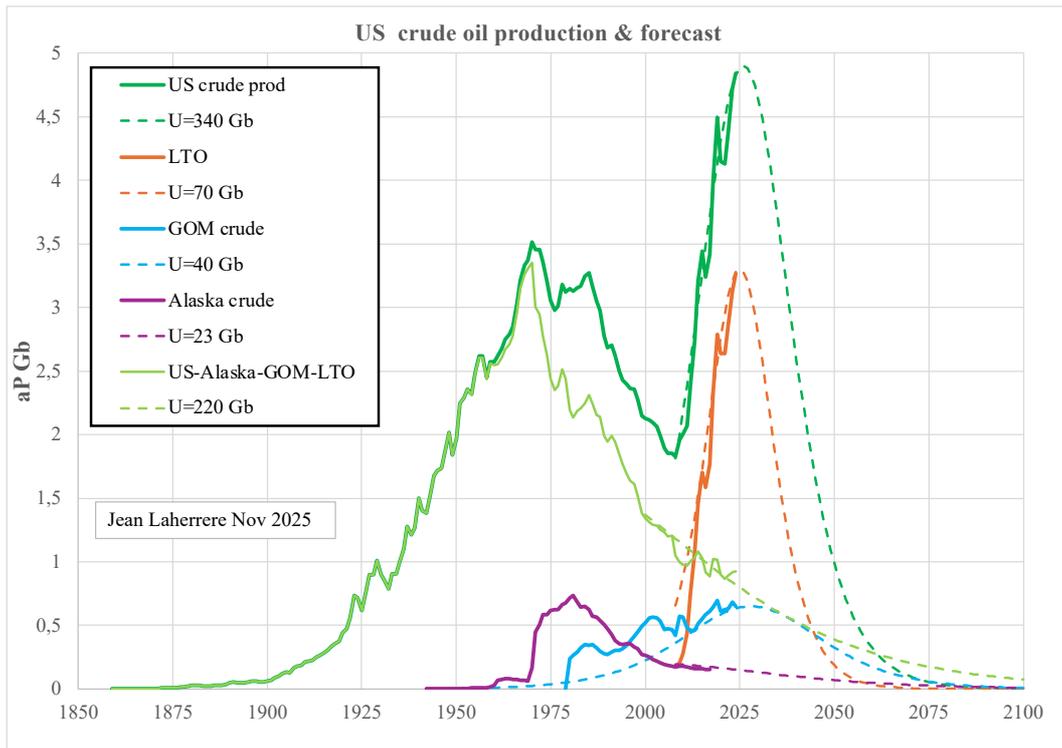
AEO2025 forecasts for 2050 US dry NG production at 42 Tcf when my forecast is 7 Tcf!  
It is 6 times less!

Evolution of AEO production forecasts of US NGPL production



AEO2025 is much more optimistic than AEO2023

**-US, Alaska, GOM & LTO crude oil production**  
US, LTO, GOM, Alaska crude production is displayed:

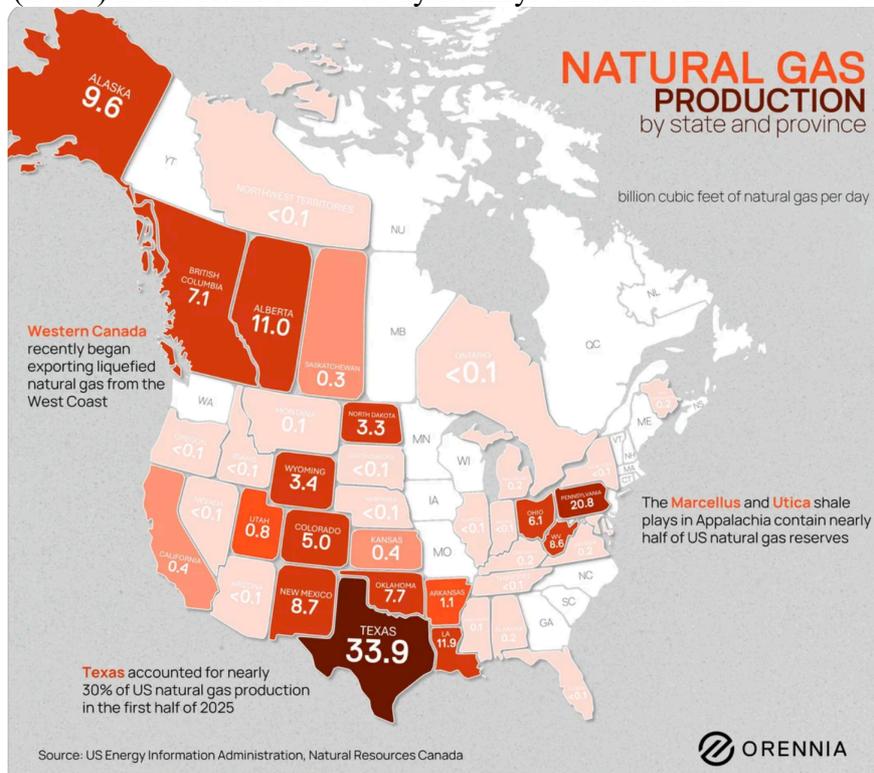


The ultimates are Alaska 23 Gb, GOM 40 Gb, LTO 70 Gb, US 340 Gb  
 Future declines are steep for LTO less for Alaska and GoM!

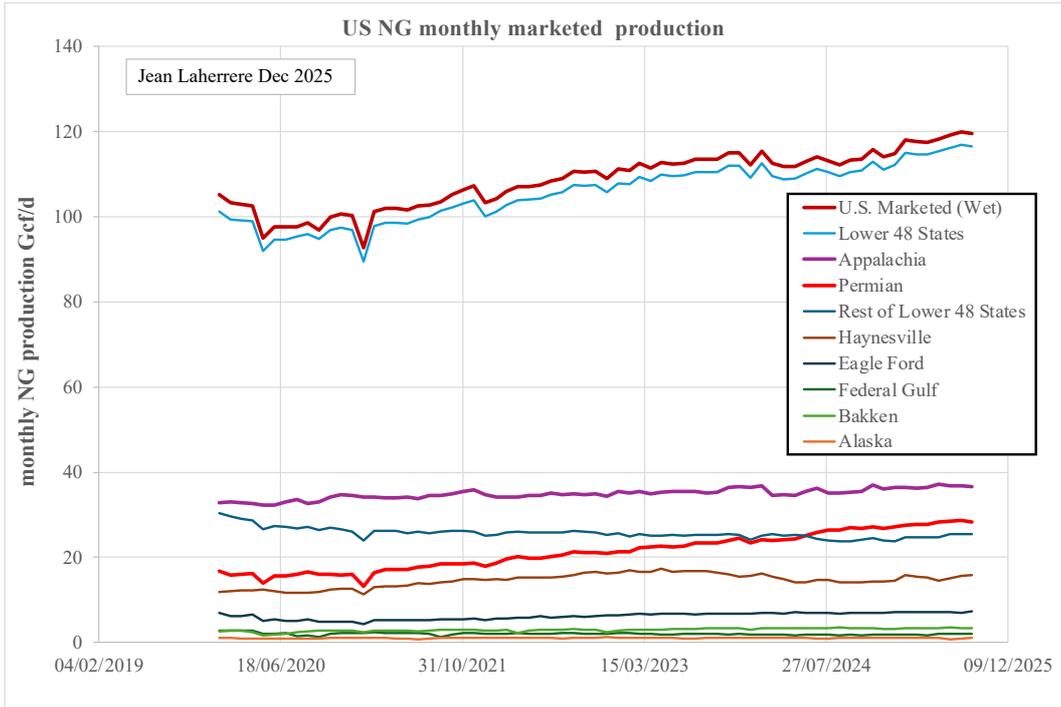
**-US NG production**

US NG production by State from

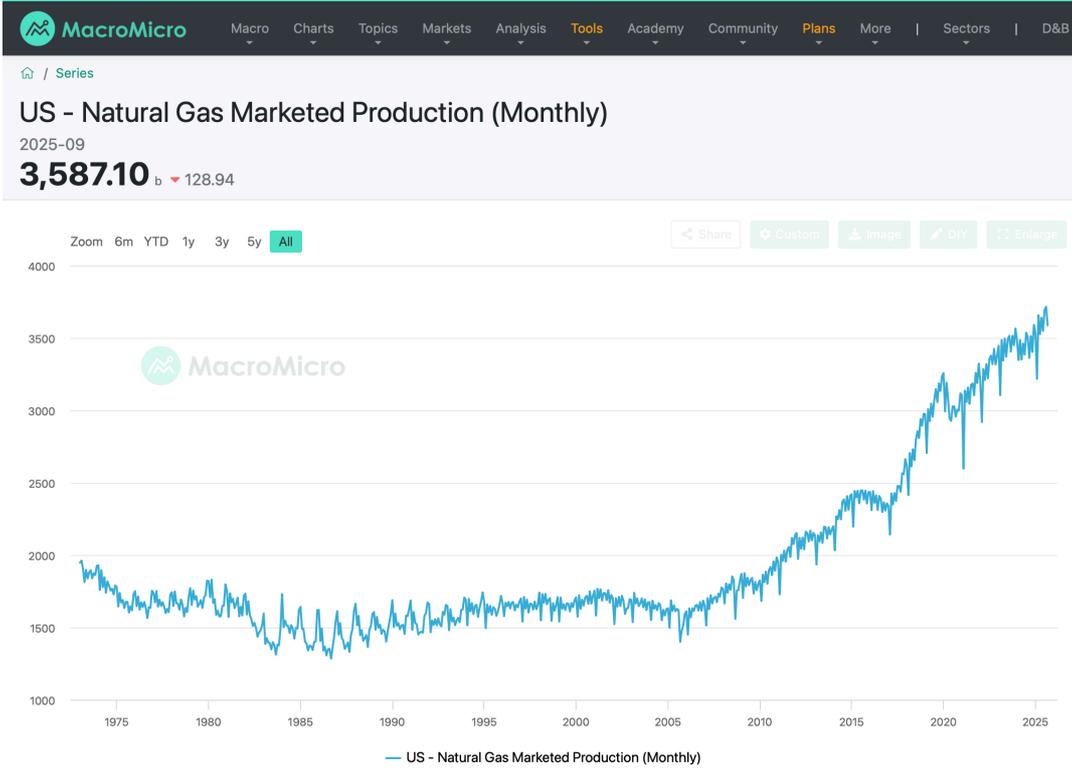
[https://www.reddit.com/r/dataisbeautiful/comments/1mwex88/north\\_american\\_natural\\_gas\\_production\\_by\\_state/](https://www.reddit.com/r/dataisbeautiful/comments/1mwex88/north_american_natural_gas_production_by_state/) the largest State NG producer (Gcf/d) is the Texas followed by Pennsylvania and Alaska



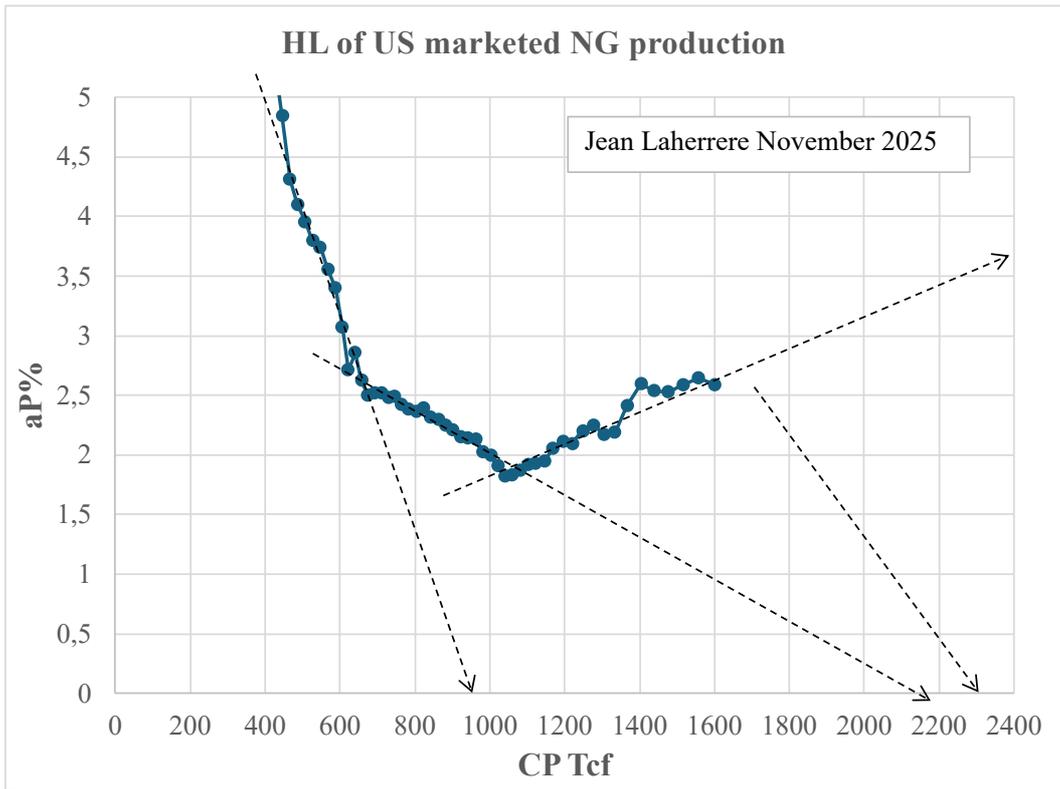
EIA reports NG monthly production by play since 2020 to September 2025 and even to 2026



Macromicro displays NG marketed monthly production since 1973:



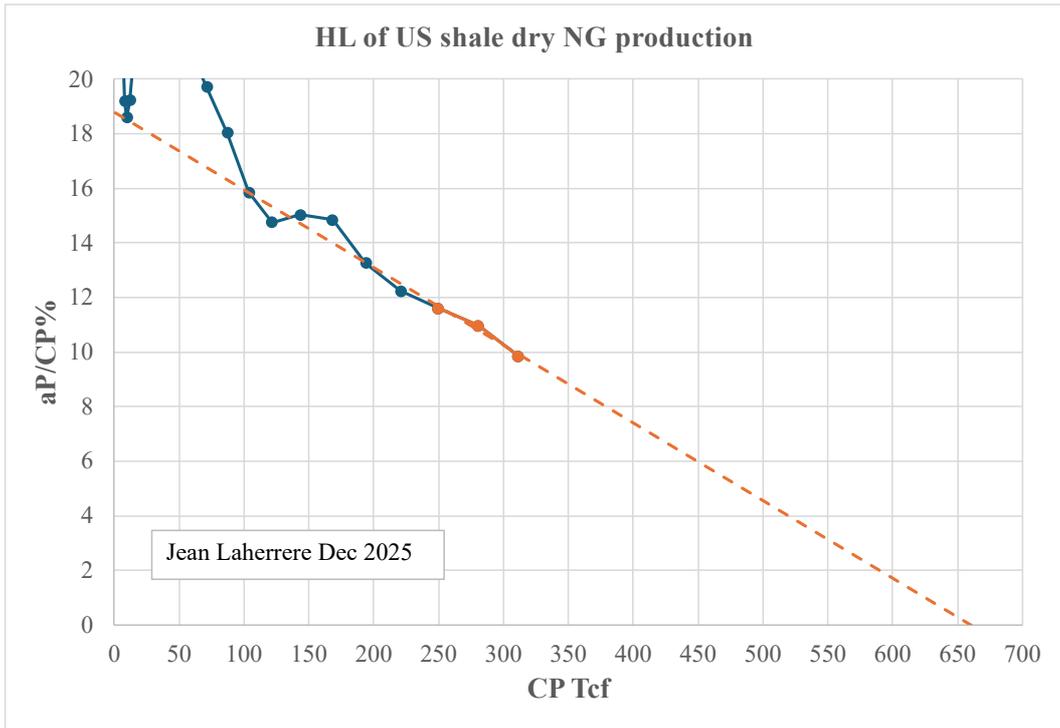
HL of US NG annual production is useless, trending towards infinite



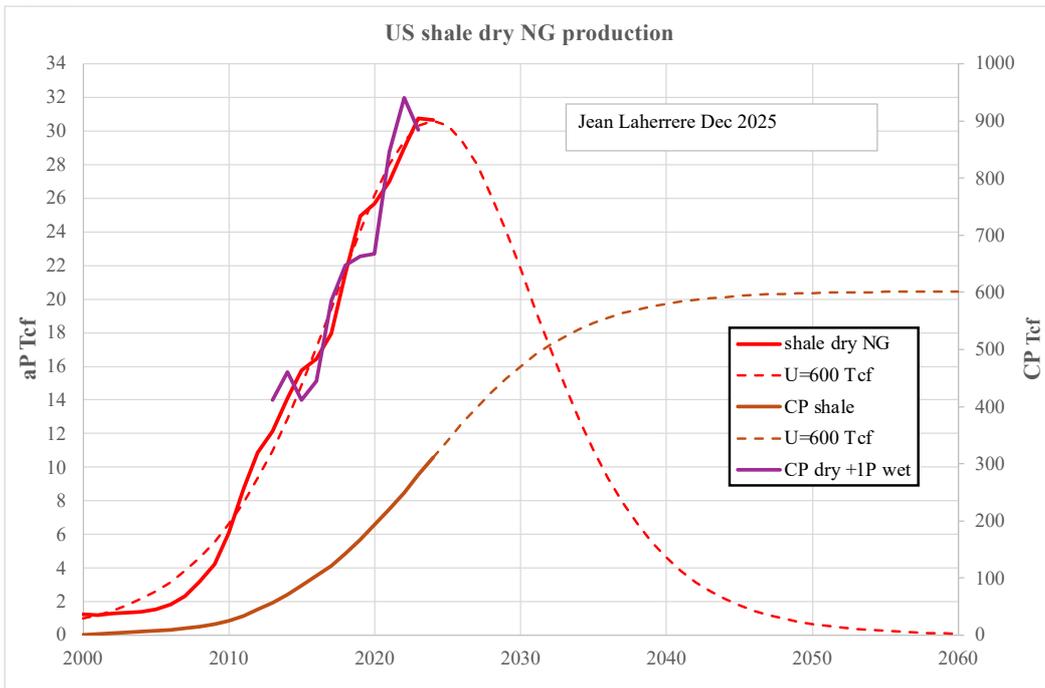
But HL of US tight NG trends towards 580 Tcf



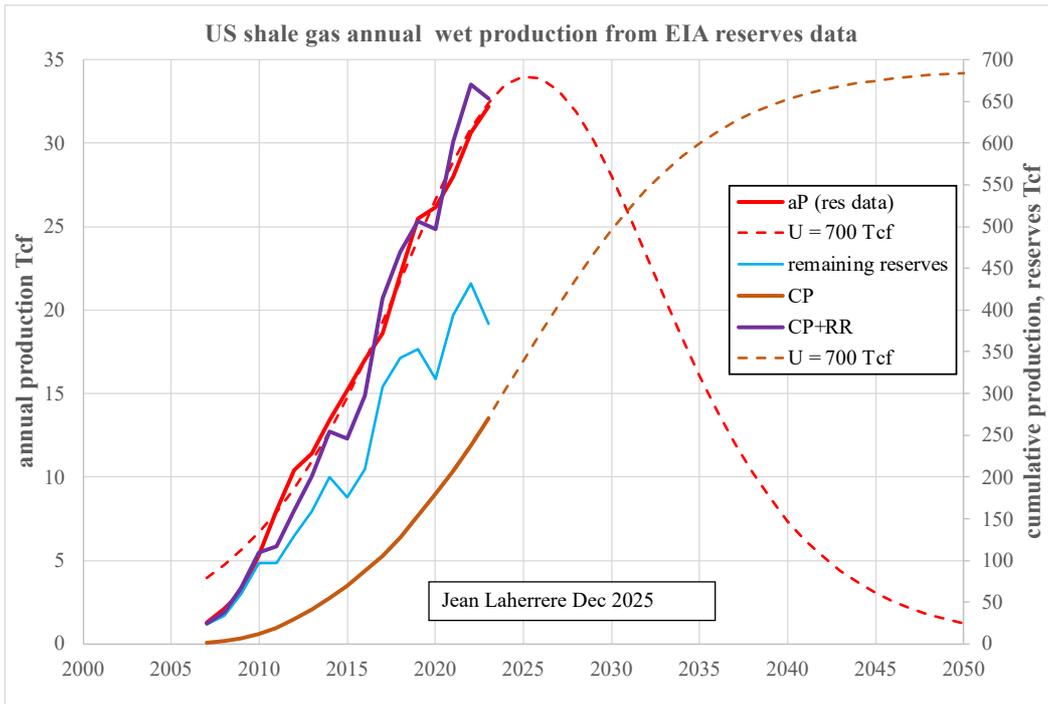
But HL of US shale NG annual dry production trends towards 660 Tcf



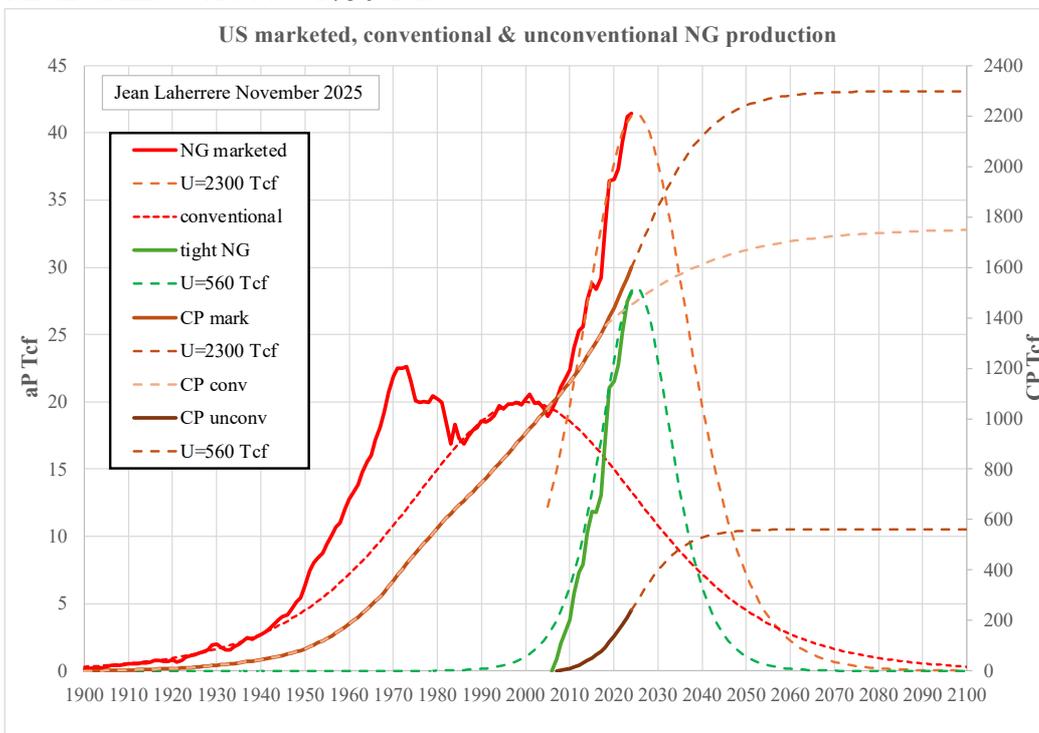
But a best fit of 600 Tcf for shale dry gas annual production is displayed, but CP+1P is well over at 900 Tcf



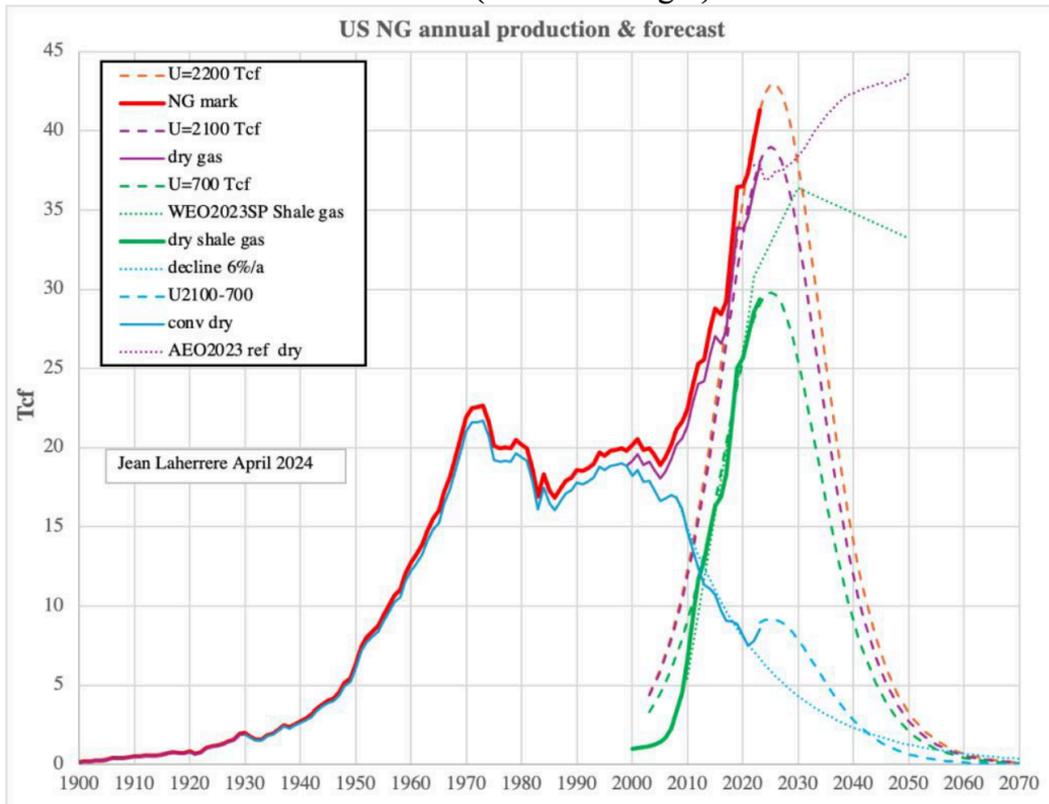
The wet gas production from reserves data is modelled for about 700 Tcf ultimate



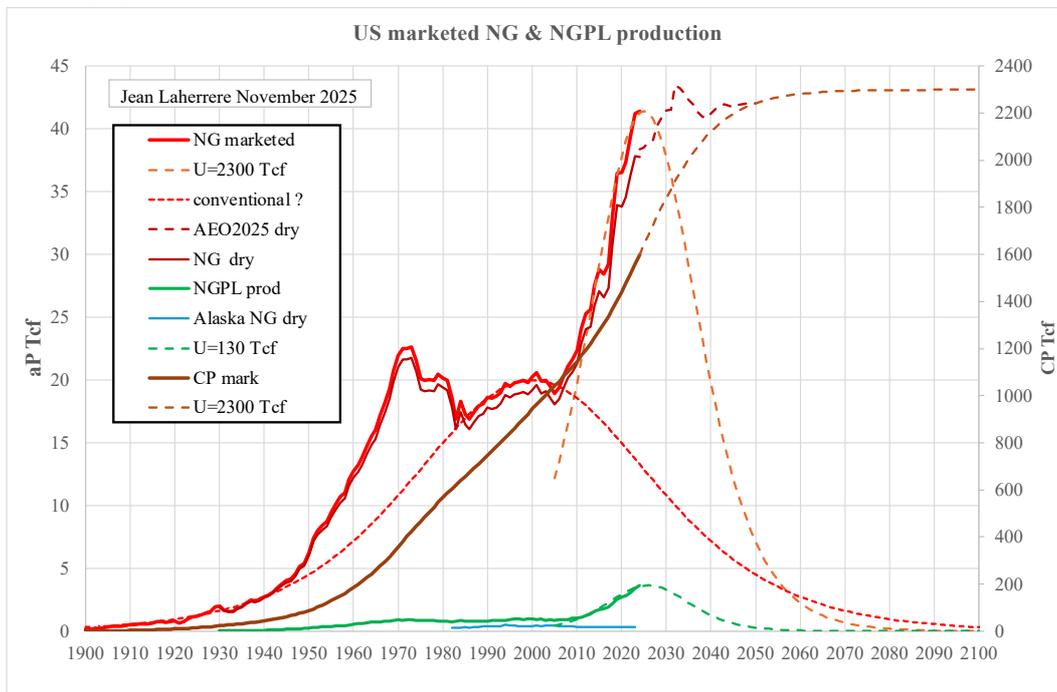
By best fitting ultimates of 560 Tcf and 2300 Tcf are estimated for tight NG and NG marketed, giving a peak in 2025. NG production from 1985 to 2005 peaks in 2000 and could be considered as the conventional NG with an ultimate of about 1750 Tcf.



In April 2024 my estimate was slightly different (also as dry gas is compared with marketed=wet) with 700 and 2100 Tcf, when 2300 Tcf



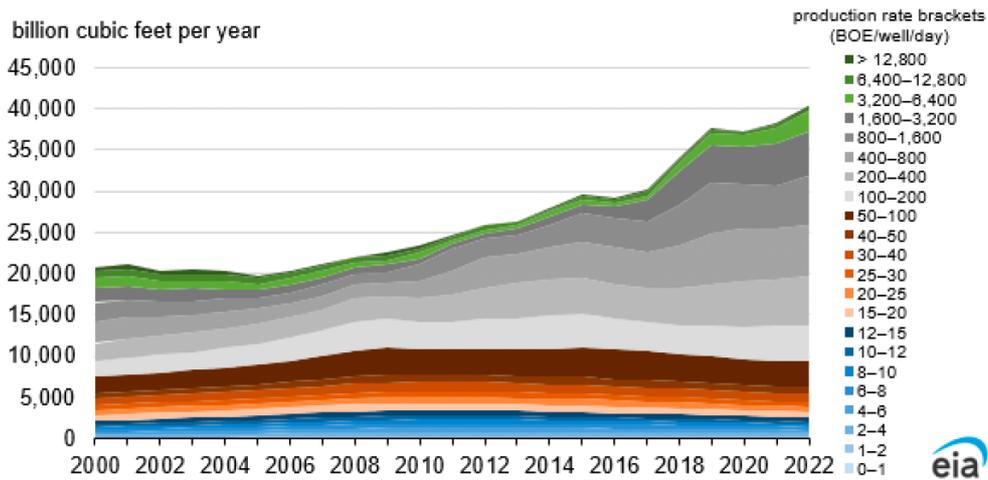
For an ultimate of 2300 Tcf US NG production is peaking now and in 2050 will produce 7 Tcf when AEO2025 forecasts 42 Tcf!



Alaska NG production is negligible, compared with USL48!

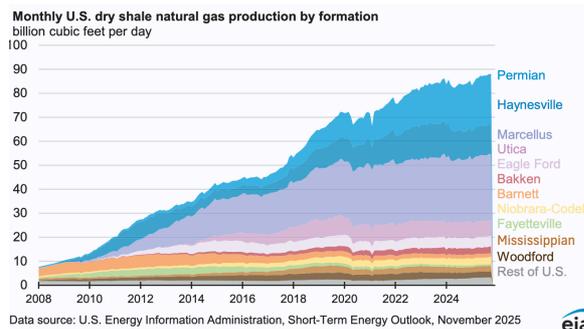
EIA displays this graph of US NG production from wells by production rate brackets: The low production wells (dark brown) peaked in 2015, when the high production wells increase since 2010!

**Figure 4. Natural gas production from U.S. wells by production rate brackets**

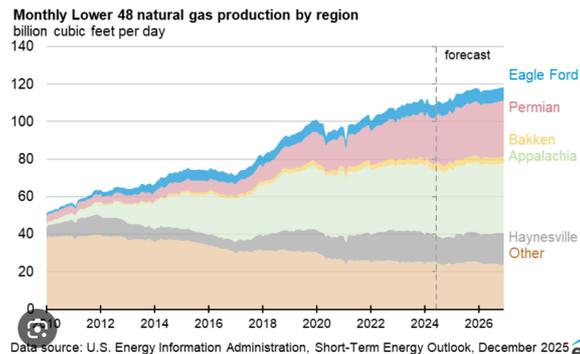


Data source: U.S. Energy Information Administration and Enverus  
 Note: BOE=barrels of oil equivalent

EIA graph 2008-2026 dated November 2025 & 2010-2027 December 2025 on NG shale production showing production still growing in 2026 in line with AEO2025



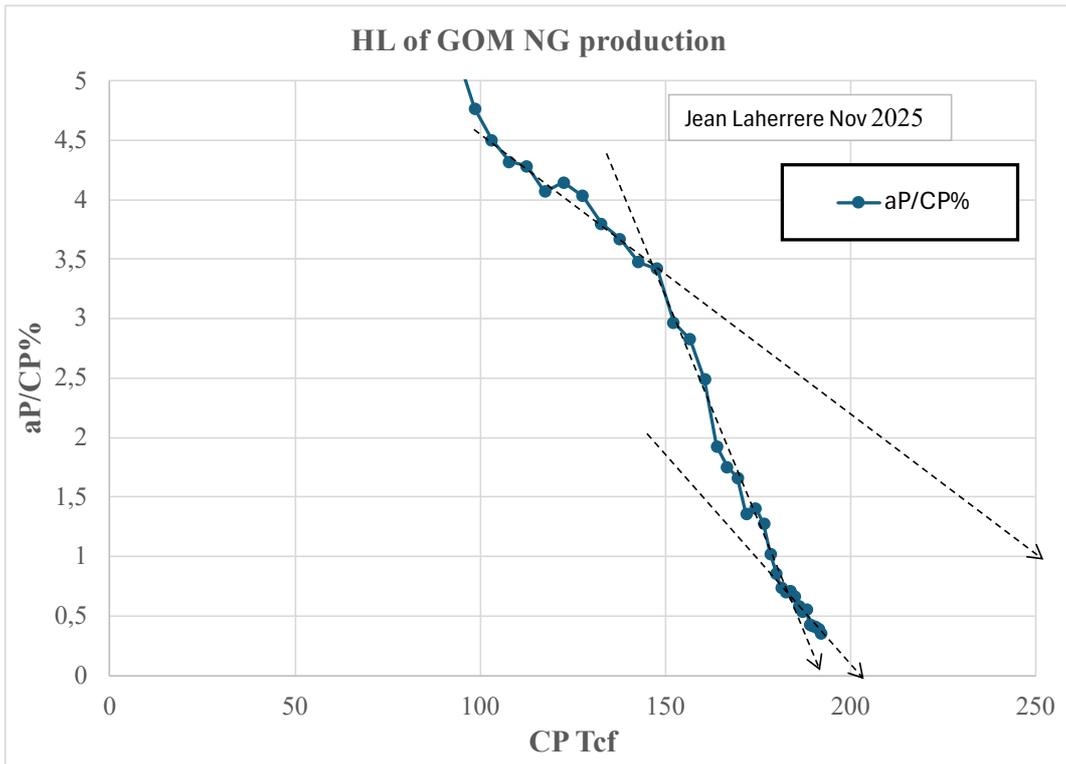
Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, November 2025



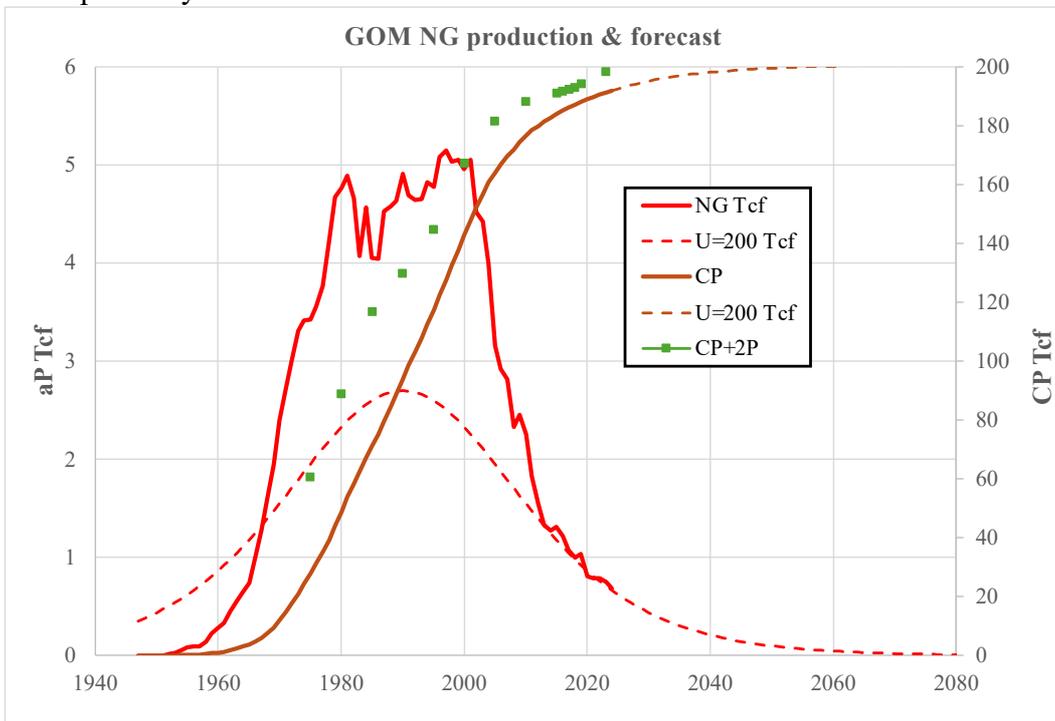
Data source: U.S. Energy Information Administration, Short-Term Energy Outlook, December 2025

**-GoM NG**

HL of GoM NG production trends towards 200 Tcf



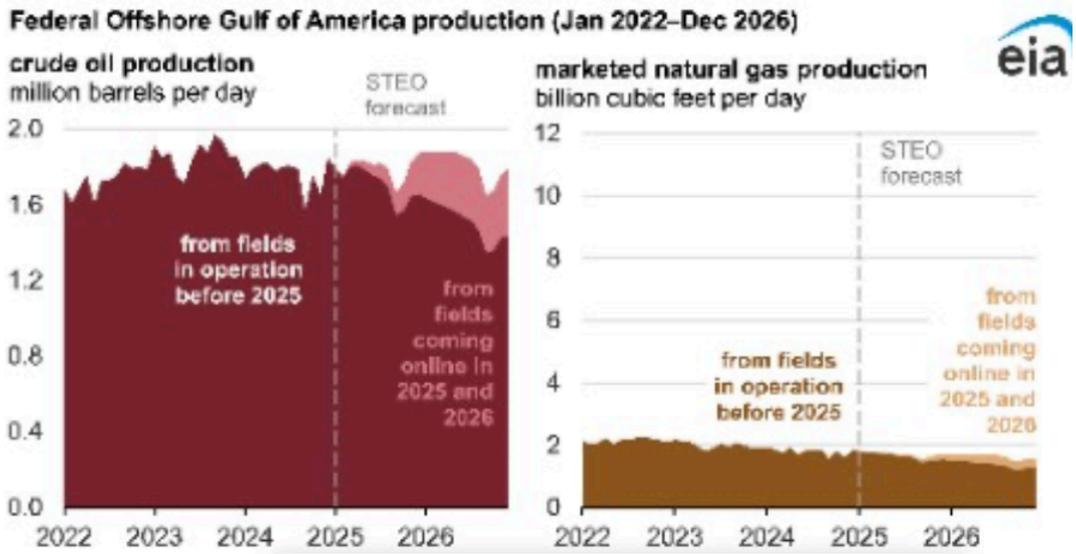
GoM NG production forecast: the ultimate is 200 Tcf when CP 2024+2P is 199 Tcf  
 BOEM report reserves as 2P, when oil producers listed on the US stock market are obliged by the SEC to report only 1P. BOEM is not listed on the US stock market!



BOEM reports end 2019 ultimate at 201.17 Tcf: too many significant digits, because the accuracy of the reserves is poor and only 2 significant digits should be given!

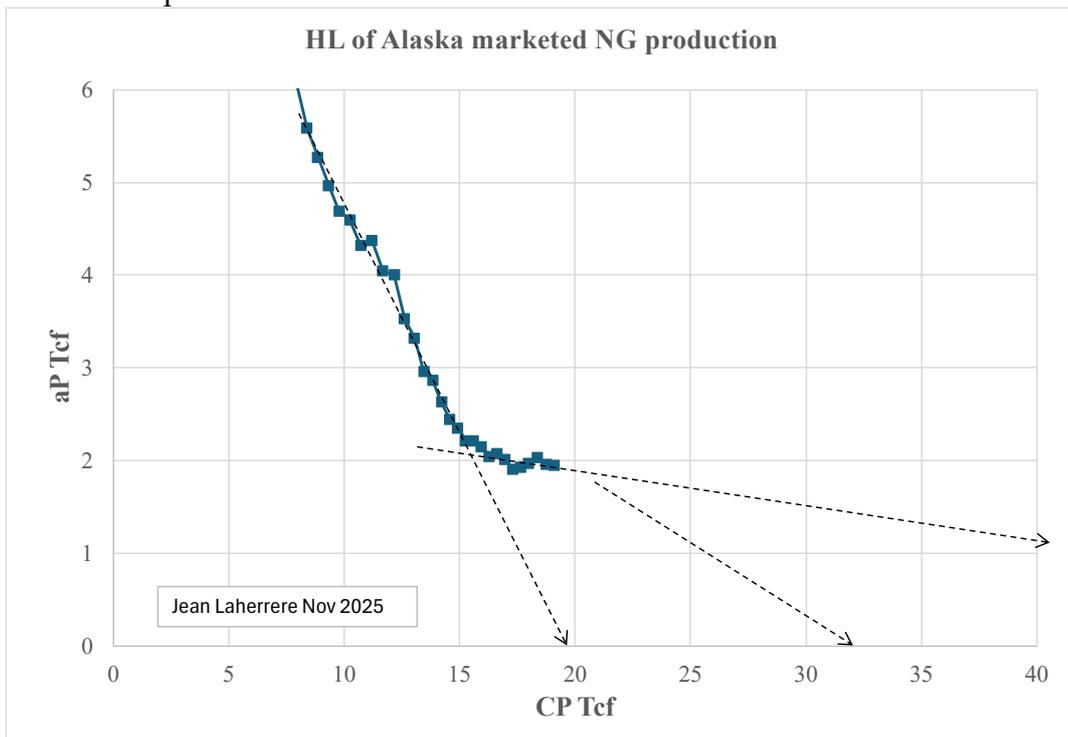
GoM NG production will decline slowly until depletion in 2080

EIA forecast for GoM: small decline for the next 2 years

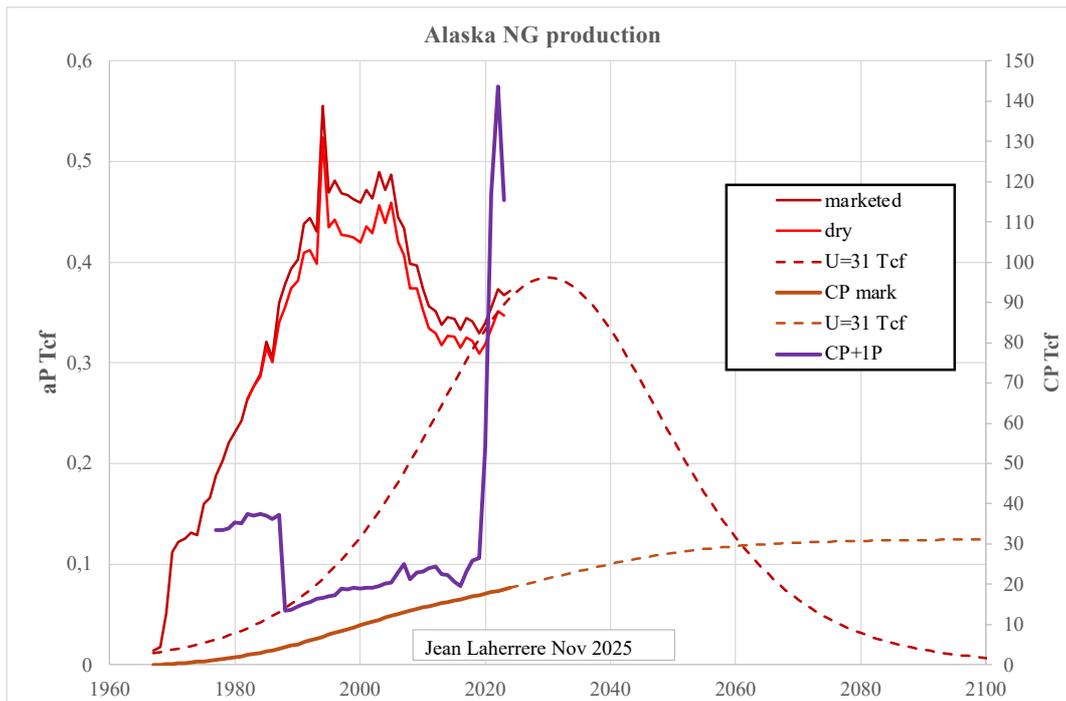


**-Alaska NG**

HL of Alaska NG production trends towards infinite

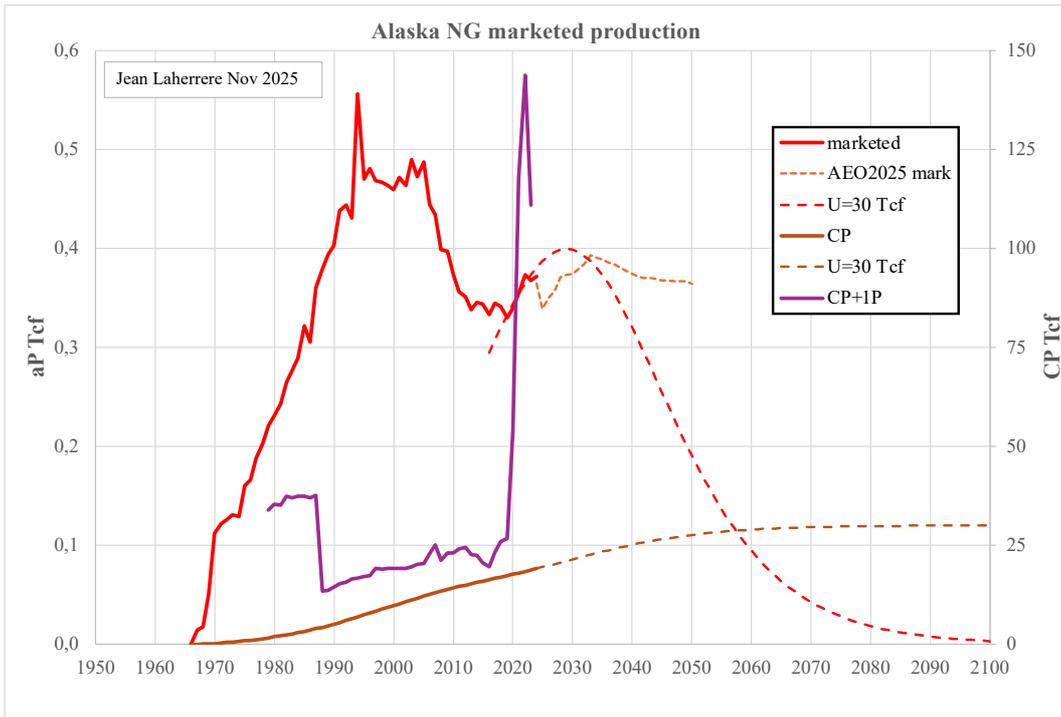


A best fit is chosen at 31 Tcf for ultimate



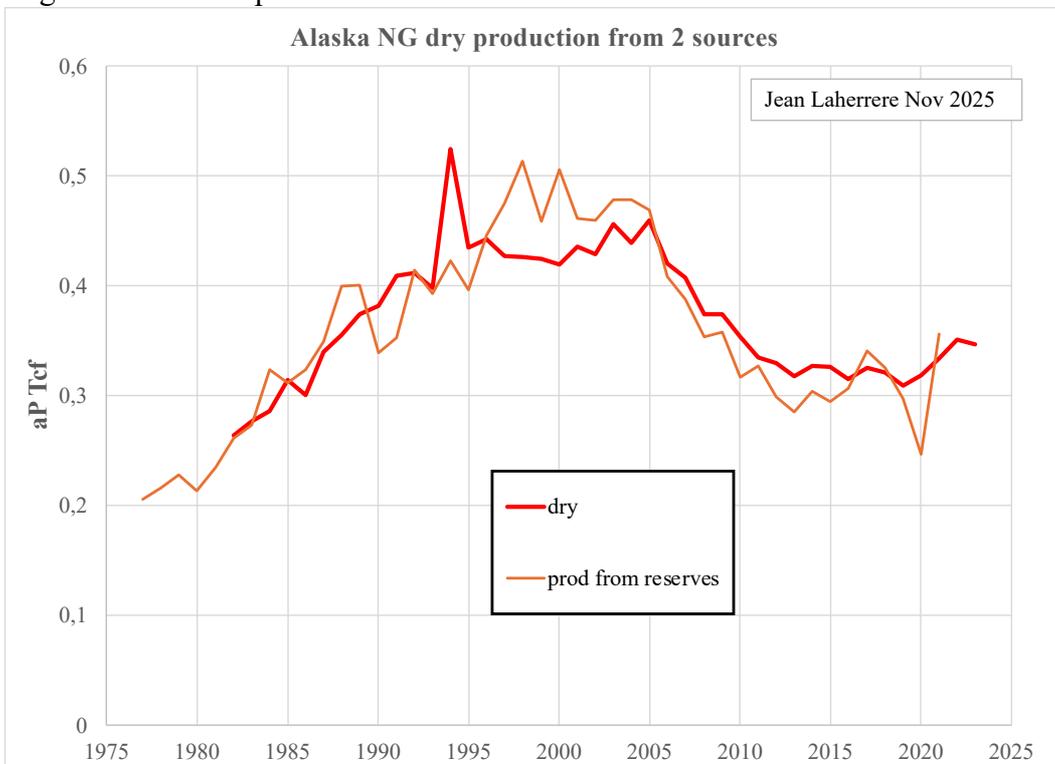
This 31 Tcf ultimate is compared with CP+1P which jumped suddenly in 2021 to over 140 Tcf. The site <https://agdc.us/alaskas-lng-project/alaskas-natural-gas-supply/> reports *The North Slope contains approximately 35 trillion cubic feet of proven natural gas reserves, and a potential resource of another 200 trillion cubic feet of natural gas. Advancements in drilling technology will allow tapping of an additional 590 trillion cubic feet of shale, tight gas, and gas hydrates.* It looks quite a promotion publicity! Gas hydrates are not concentrated see my 1999 paper <https://www.energycrisis.com/laherrere/hydrates/> « Oceanic Hydrates: an Elusive Resource » Part 1: “Gas Hydrate, Uncertain resource size enigma” Offshore, August 1999, p140-141,160-162, Part 2: “Data shows oceanic methane hydrate resource over-estimated” Offshore, September 1999, p156-158 <http://www.hubbertpeak.com/laherrere/hydrates/>

As the best fit is very unreliable, a round ultimate of 30 Tcf is chosen with a peak in 2030, giving a curve not far from AEO2025 up to 2035, but declining faster but in line with the NG decline 2005-2013. CP+1P (purple) jump in 2021 looks much too high!



Alaska Gasline Development Corpo writes: *The North Slope contains approximately 35 trillion cubic feet of proven natural gas reserves, and a potential resource of another 200 trillion cubic feet of natural gas* : in fact

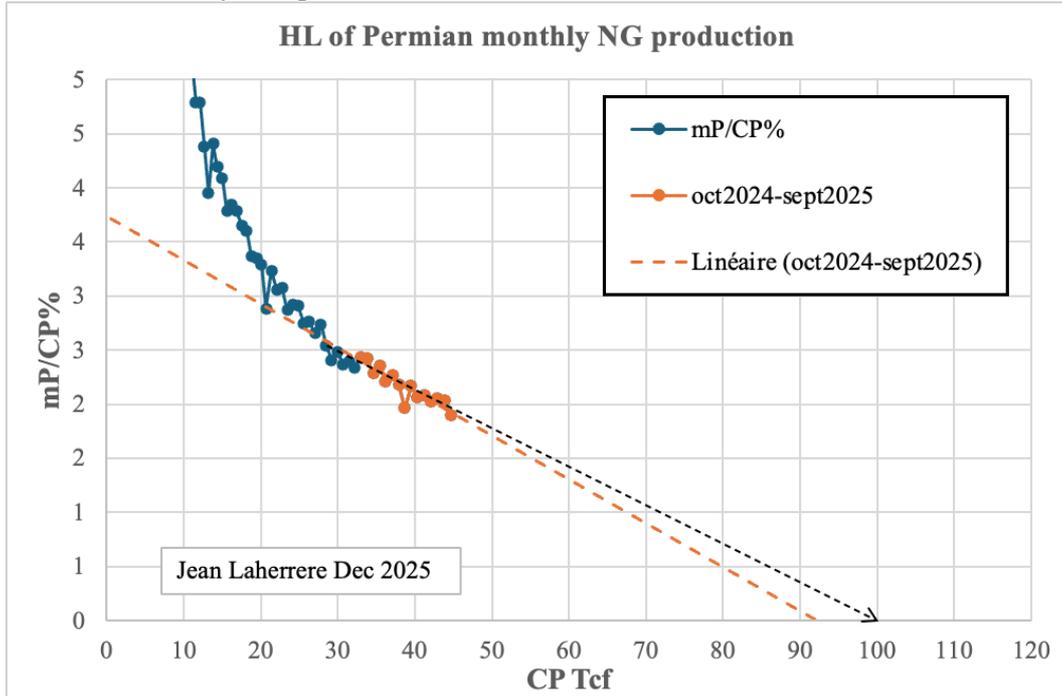
Alaska data looks unreliable; the difference for NG dry production from DPR and reserves data is significant for the period 1997-2001!



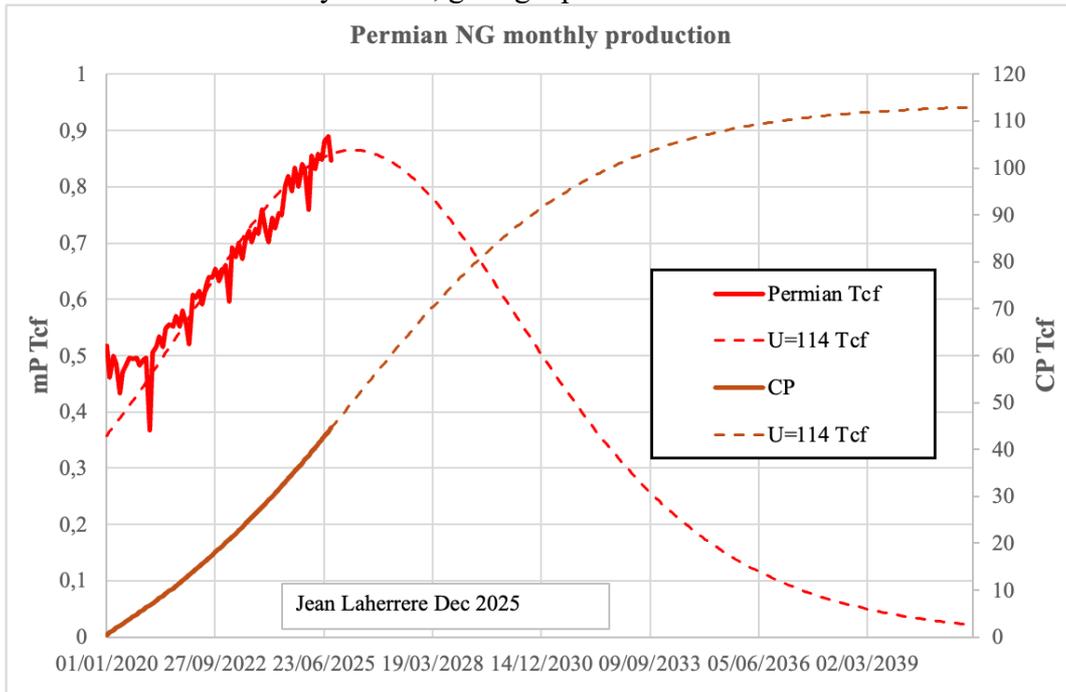
Discrepancy looks natural in the USL48 with many oil and gas fields and many State policies, not in Alaska with few fields and on state policy!

**-Permian NG**

HL of Permian monthly NG production trends towards 91 Tcf

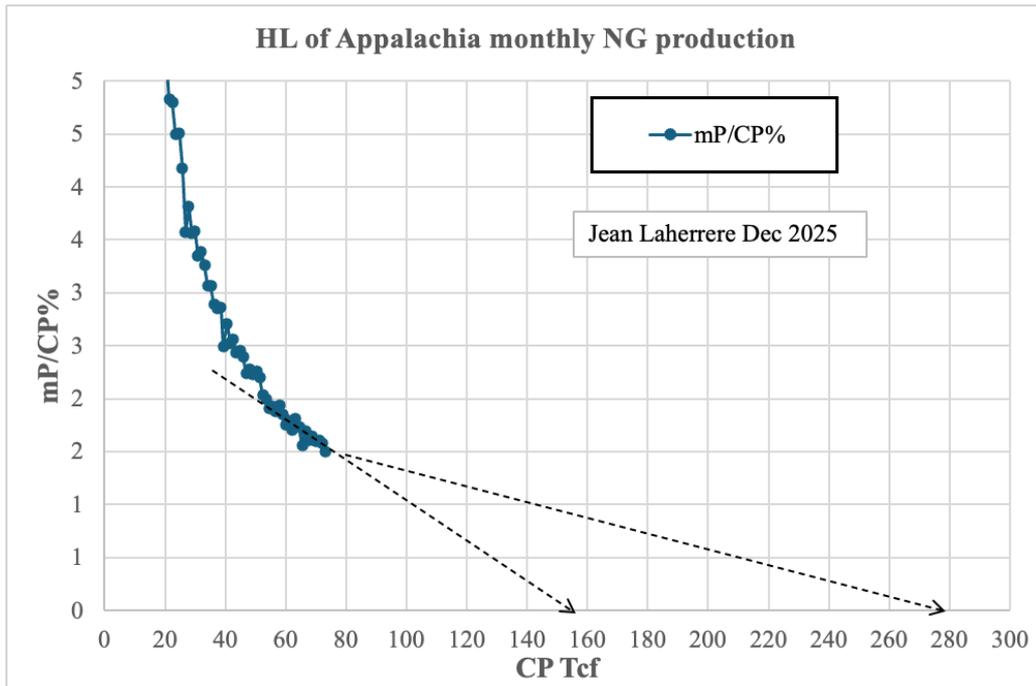


A 114 Tcf ultimate is chosen by best fit, giving a peak in 2026

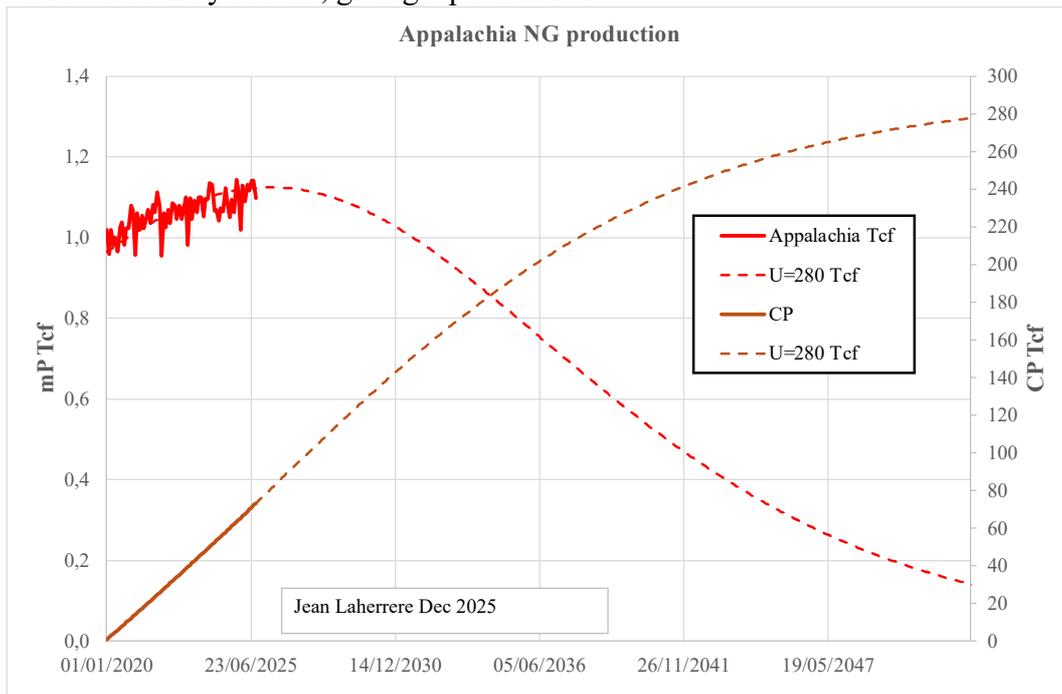


-Appalachia NG = Marcellus + Utica

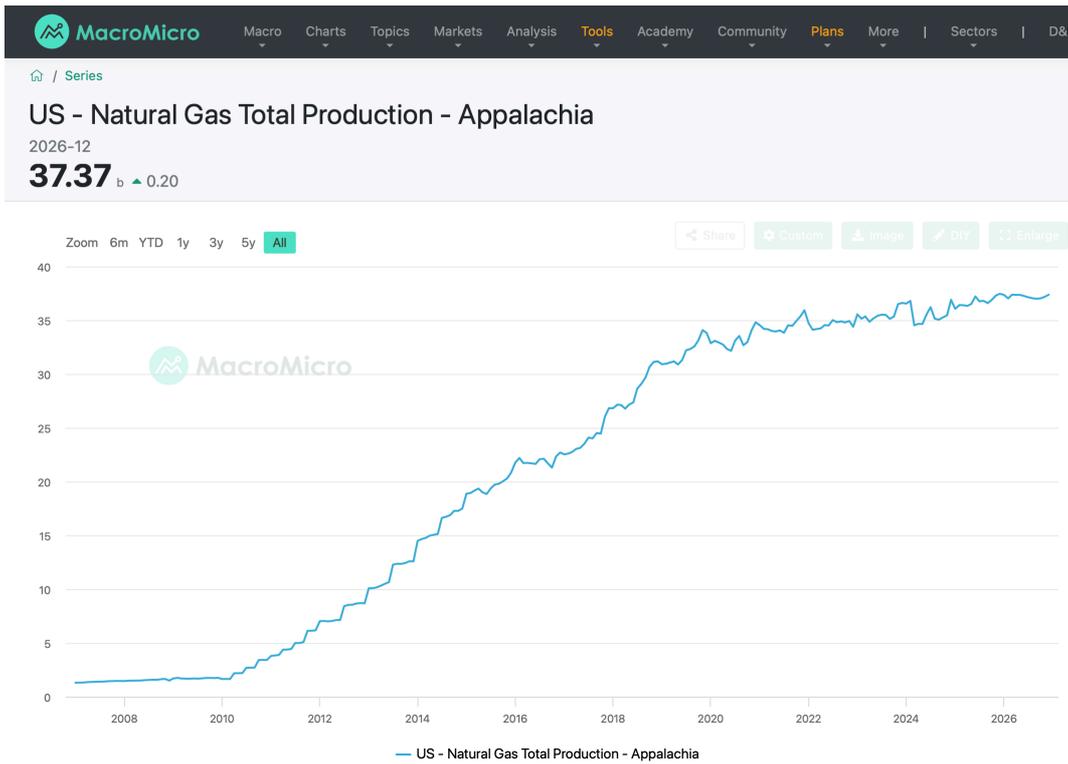
HL of Appalachia (Marcellus + Utica) NG production displays a parabolic curve, difficult to extrapolate



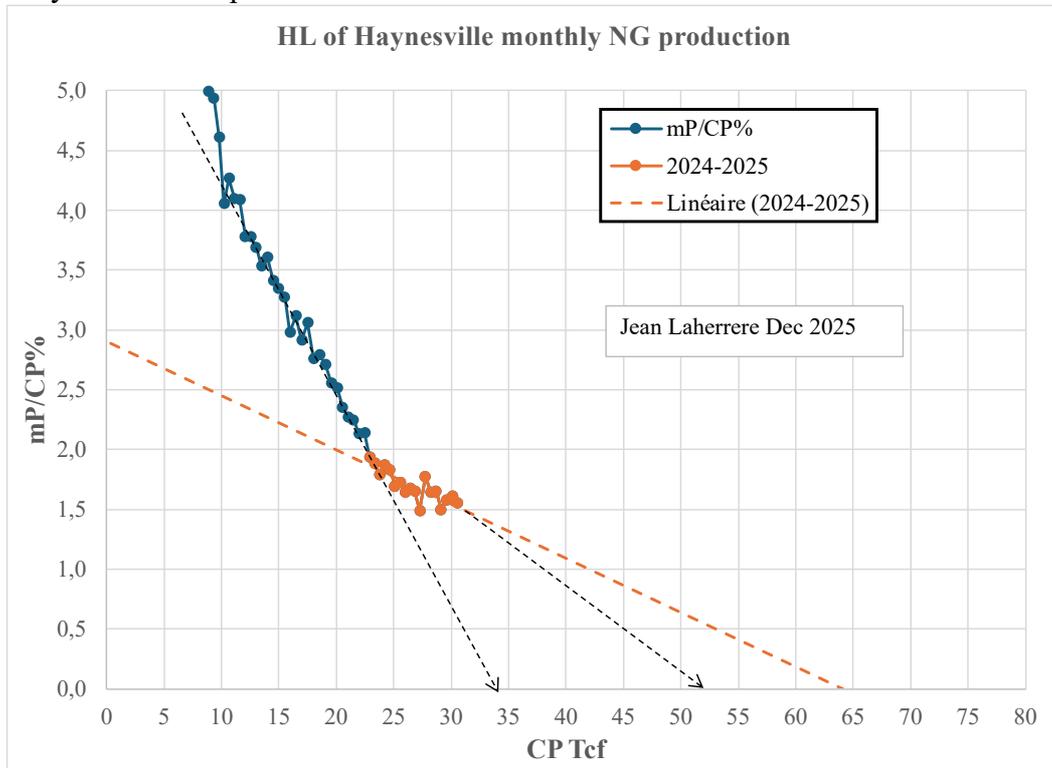
A 280 Tcf is chosen by best fit, giving a peak in 2026



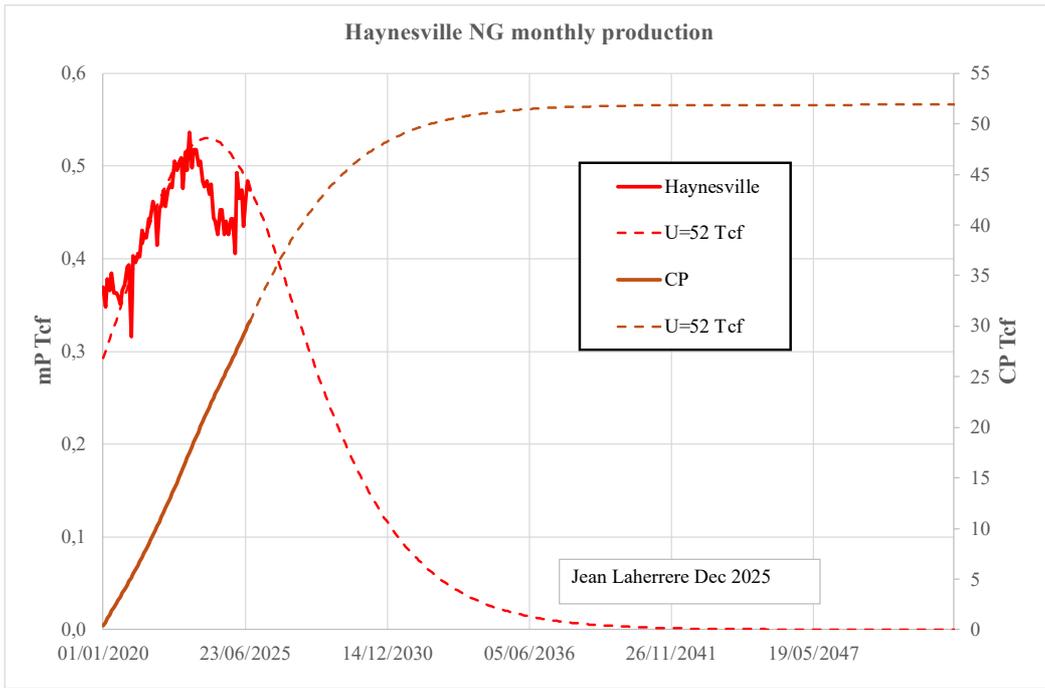
Macromicro displays Appalachia NG production from 2007 to 2026, with a large increase 2010-2020 and a small one since 2020, flattening in 2026!



**-Haynesville NG**  
HL of Haynesville NG production trends towards 63 Tcf

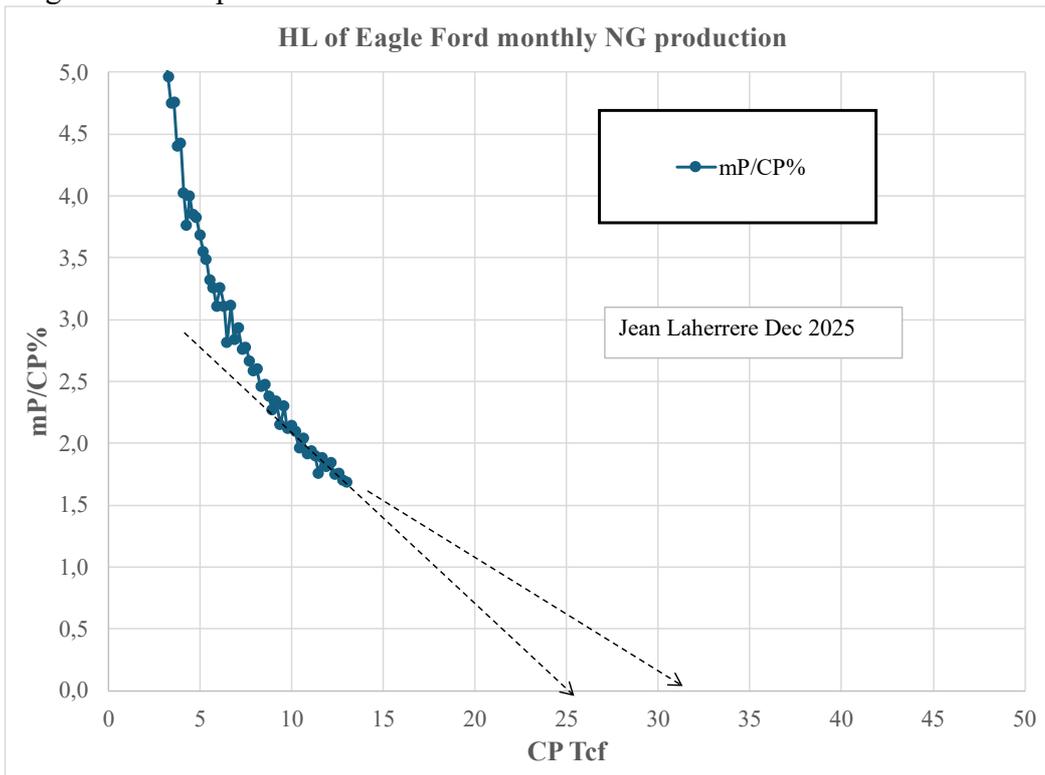


But the best fit is a 52 Tcf ultimate, meaning that the peak was in mid 2023 with future decline from today

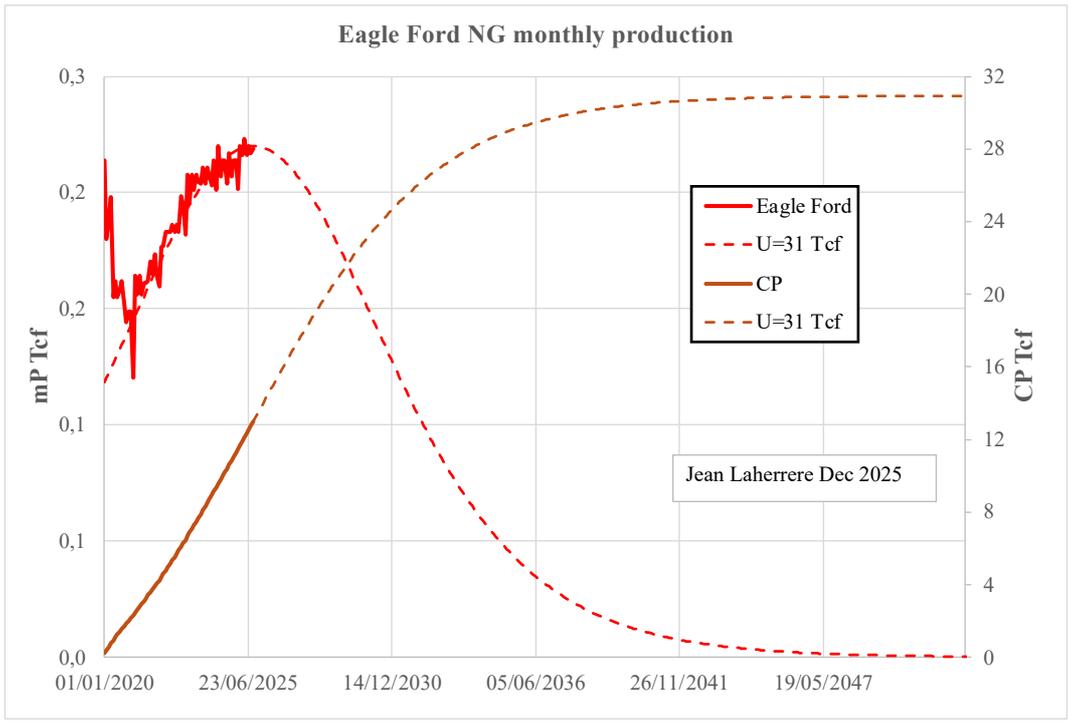


**-Eagle Ford NG**

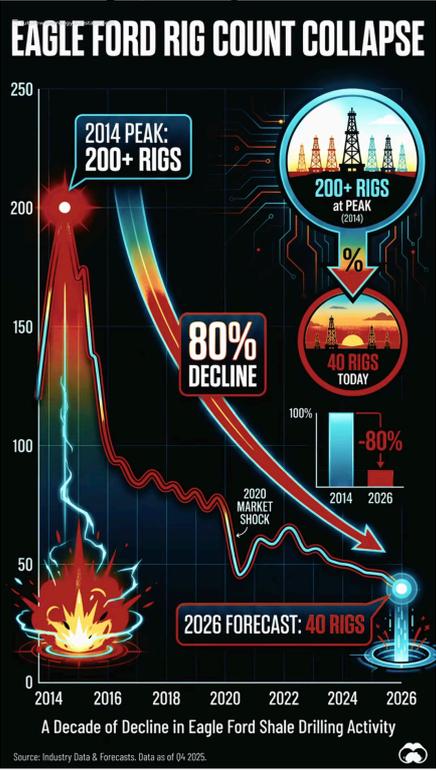
HL of Eagle Ford NG production trends towards 25 Tcf



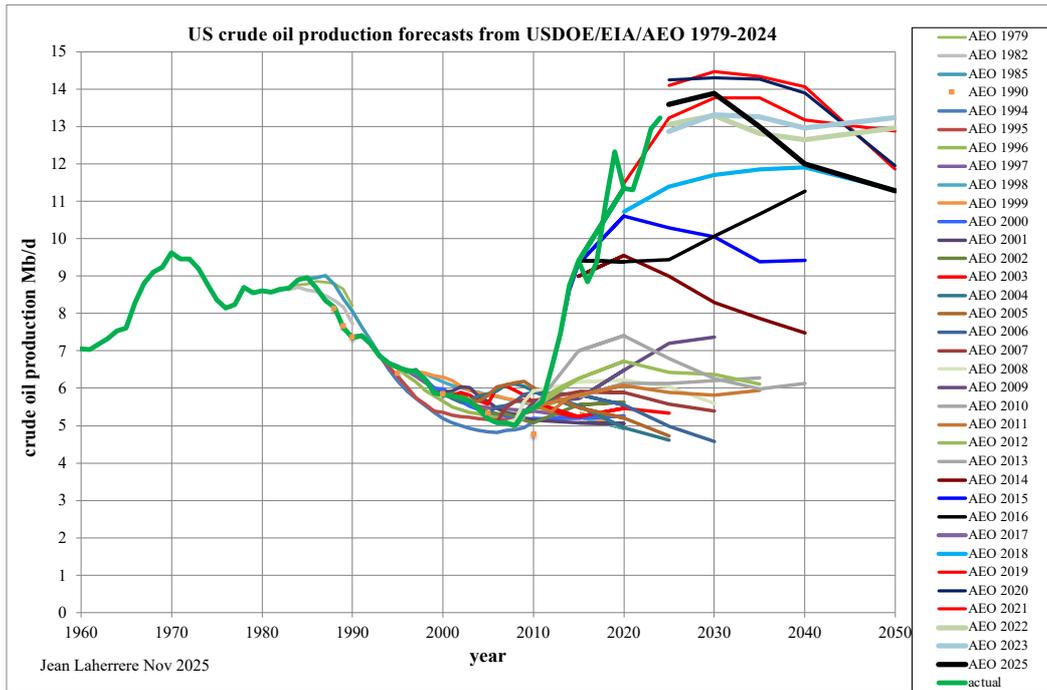
The best fit gives a 31 Tcf, meaning a today peak



Eagle Ford rig count has collapsed  
<https://www.youtube.com/watch?v=RpQxGPNgu04>



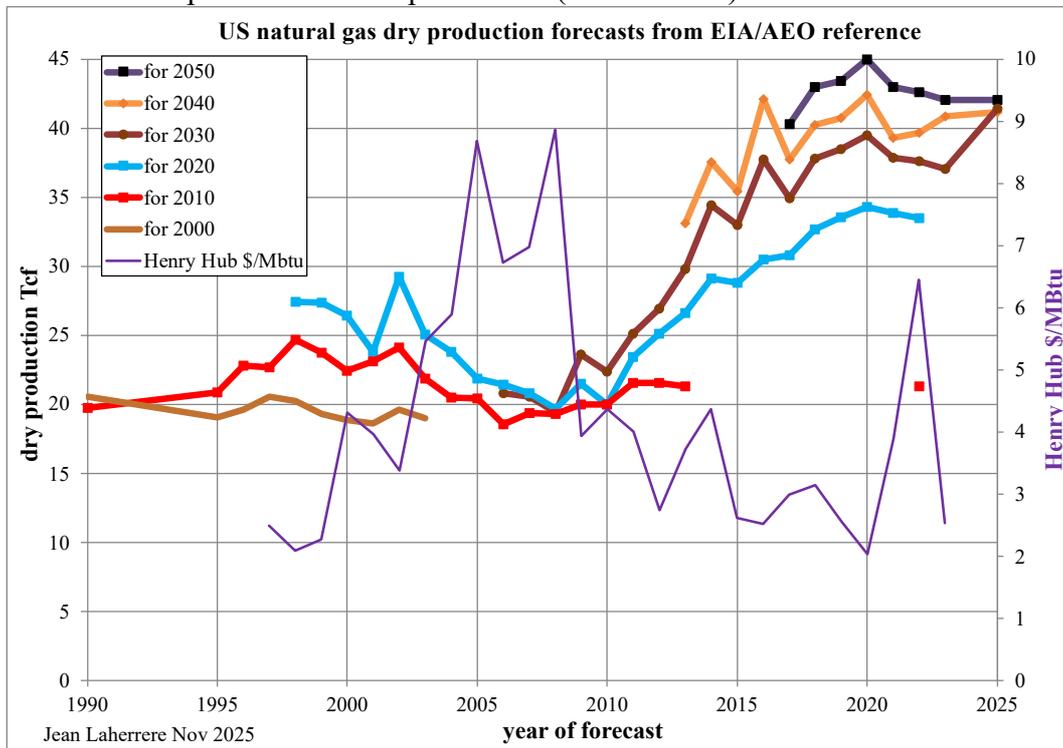
**-EIA/AEO oil production forecast evolution**  
 AEO2025 forecast (fat black) a peak of US crude oil production in 2030, mine is 2026!  
 This graph displays many past forecasts proven wrong, meaning that the reliability of EIA future forecasts is poor!



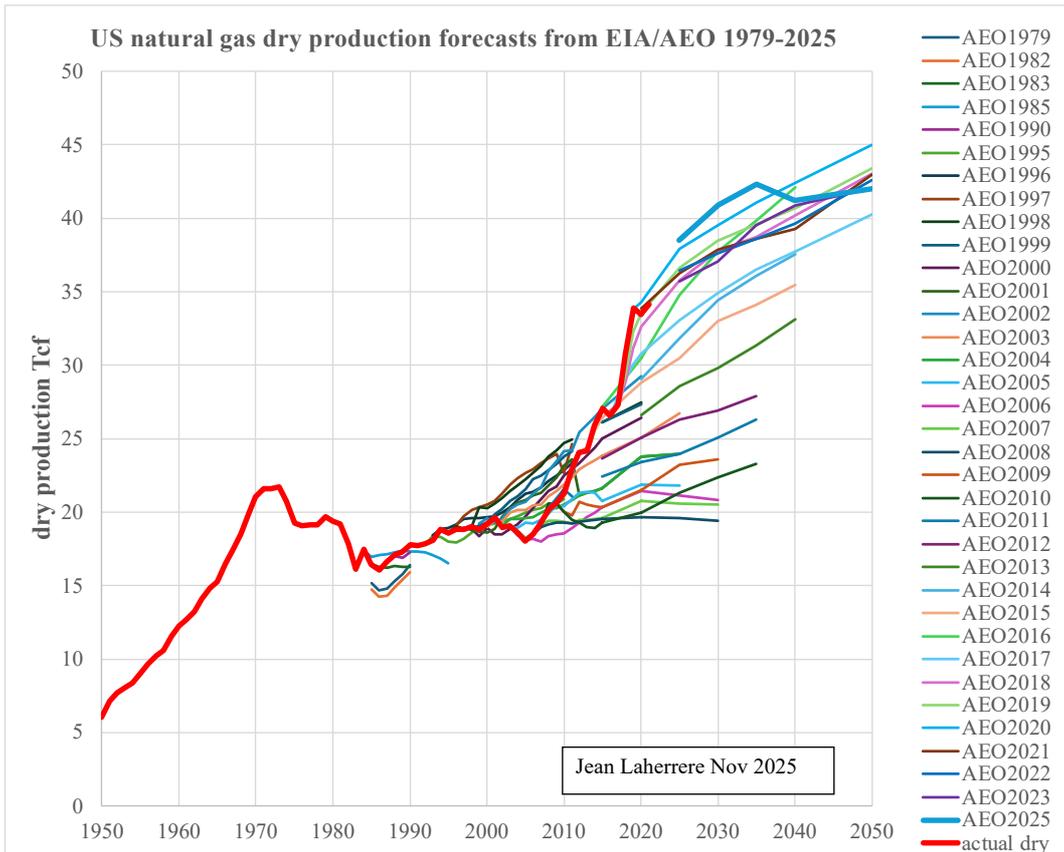
EIA does not compare its past forecasts with real data: it is a pity as you learn from your past mistakes!

### -EIA AEO NG production forecast evolution

AEO2025 is more optimistic for NG production (brown curve) in 2030 and less for 2050!

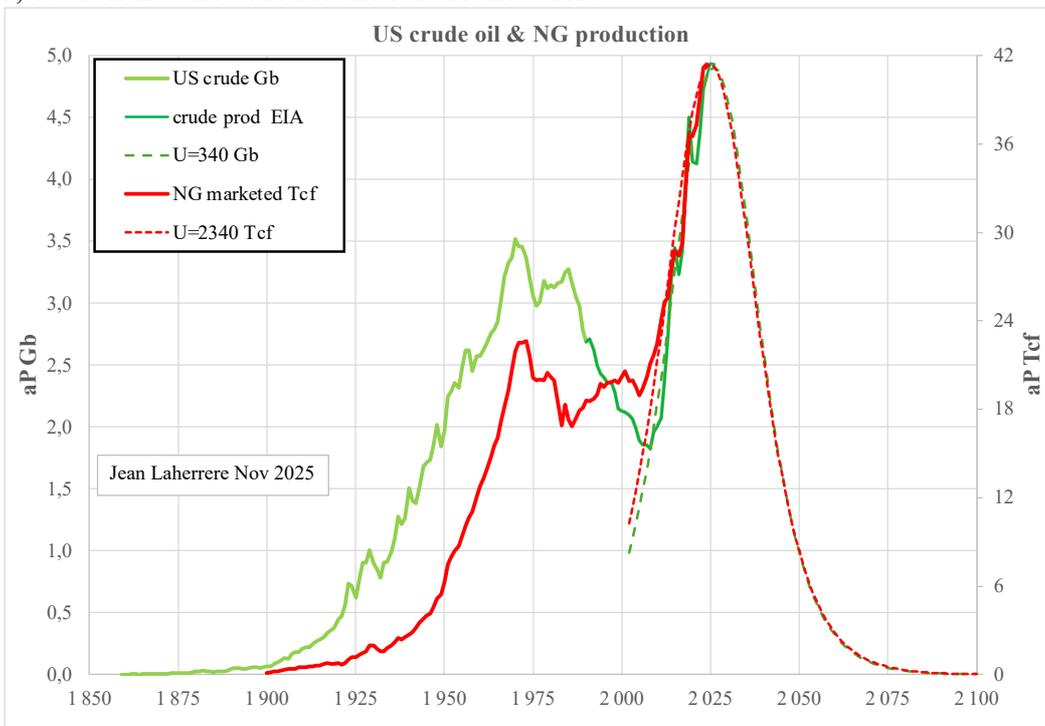


The display of EIA/AEO dry NG production from 1979 to 2025 shows that **EIA was not very good in their past forecasts, meaning that their future forecasts could be also bad!**



**-oil & NG production & forecast in volume**

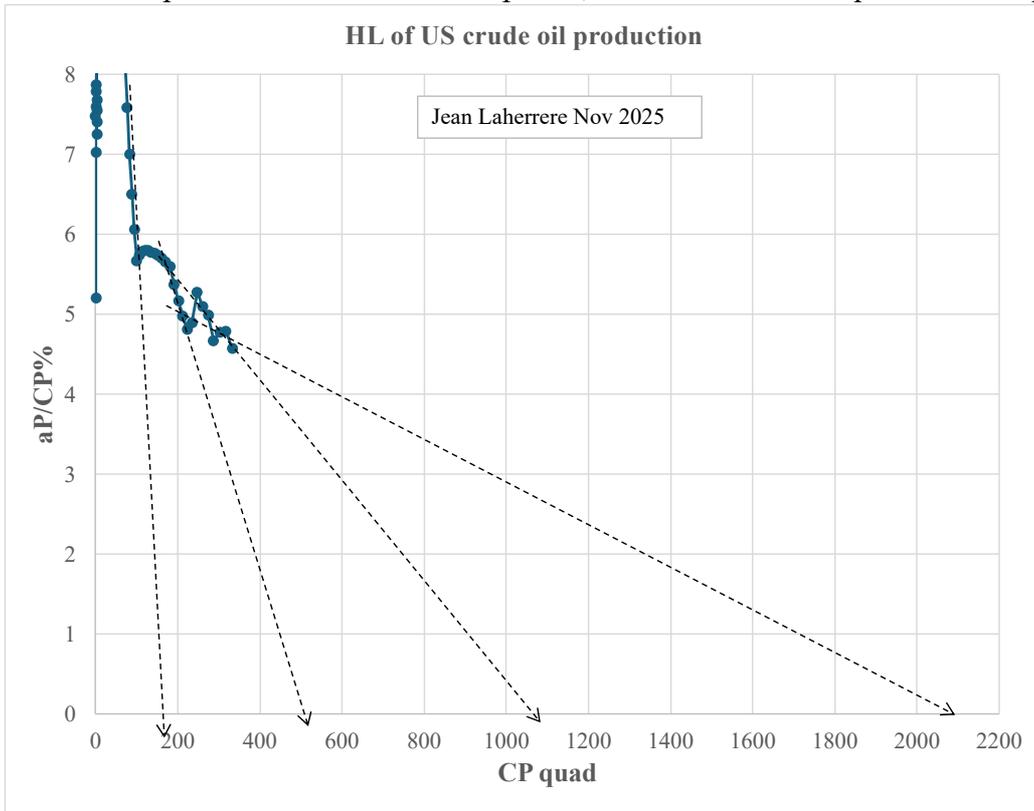
Oil and NG production are in line since 2008 as their forecasts: both peaking now and declining the same way! It is fascinating to find such similarity within oil and natural gas in the US, but it is not the case for the rest of the world!



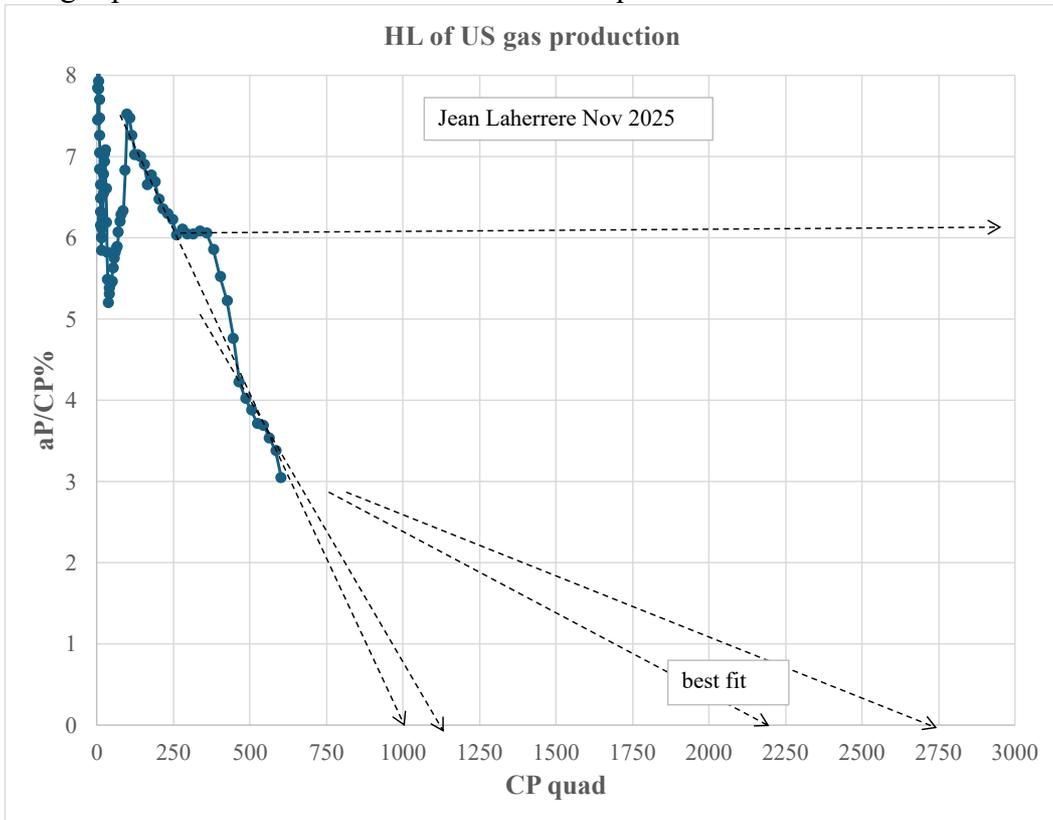
In 2050 oil production will be as in 1935 and NG production as in 1955!

**-production in energy = quad**

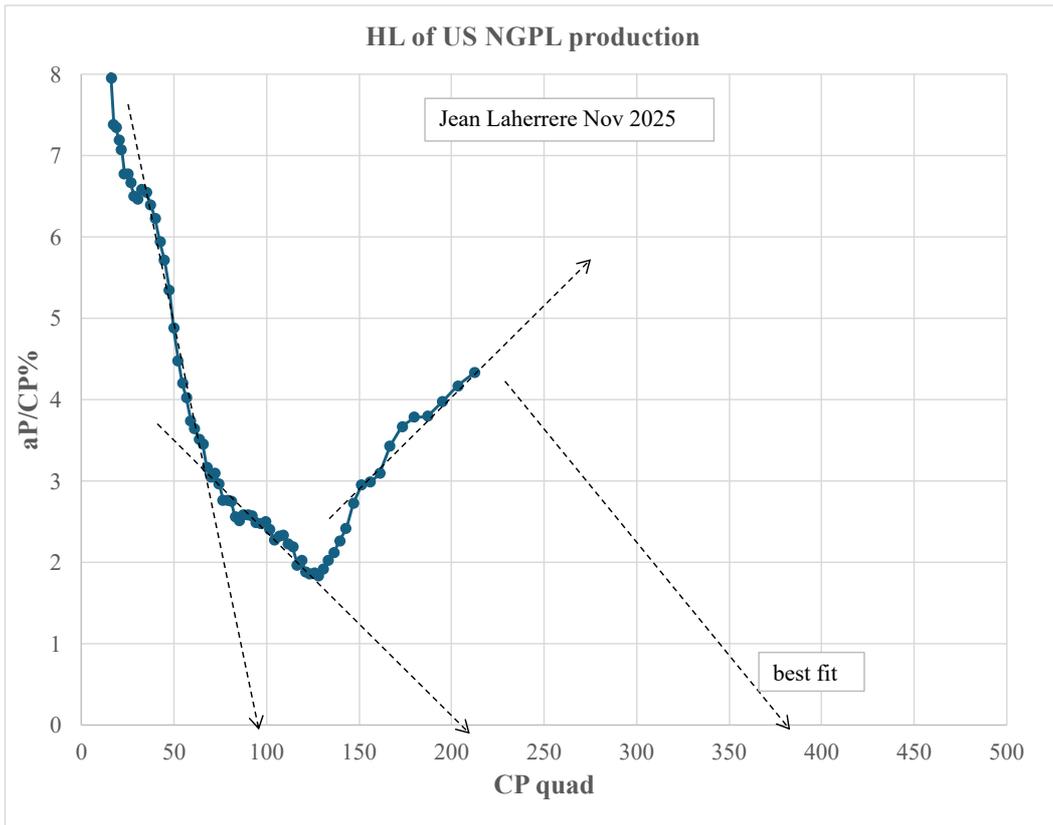
HL of US crude oil production is hard to extrapolate, towards either 100 quad or 2000 quad



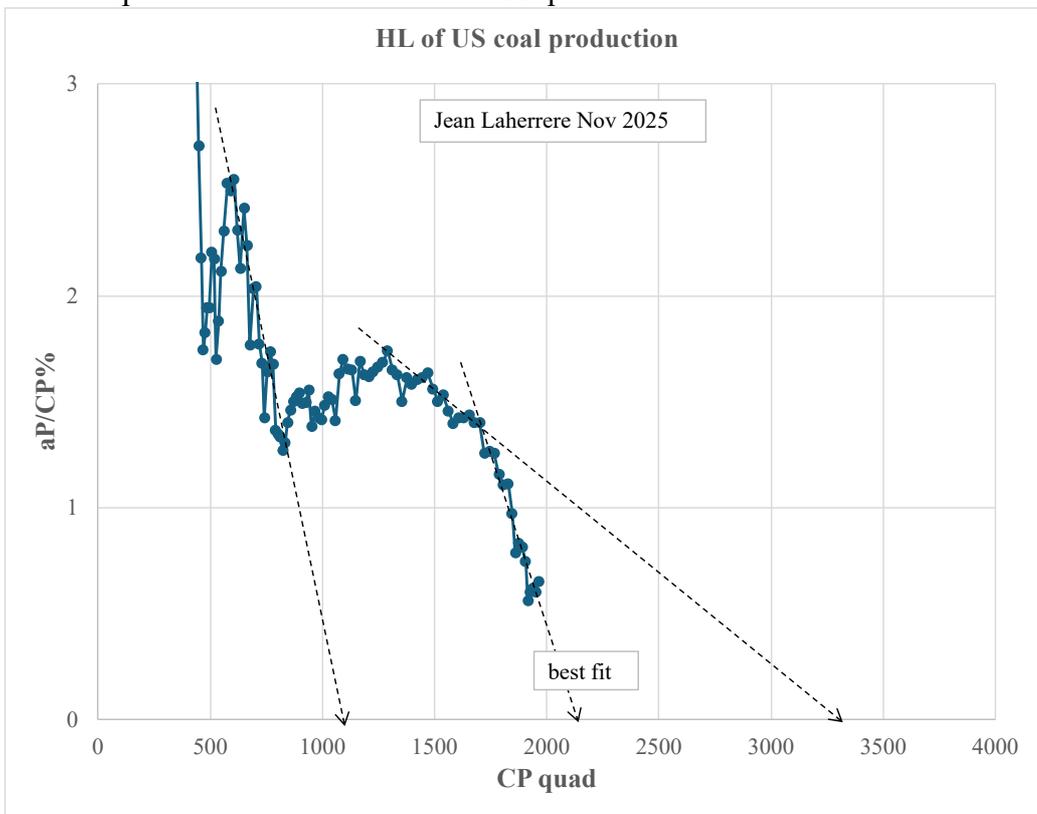
HL of US gas production trends towards about 1000 quad



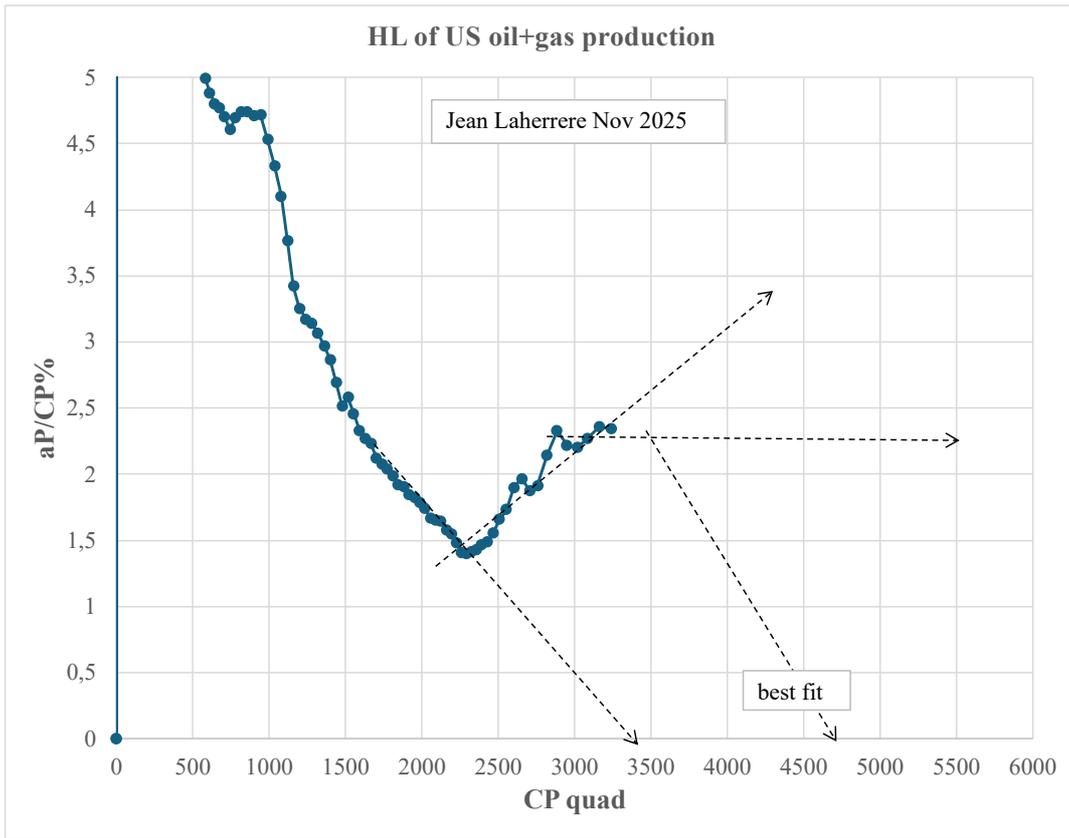
HL of US NGPL production trends towards infinite



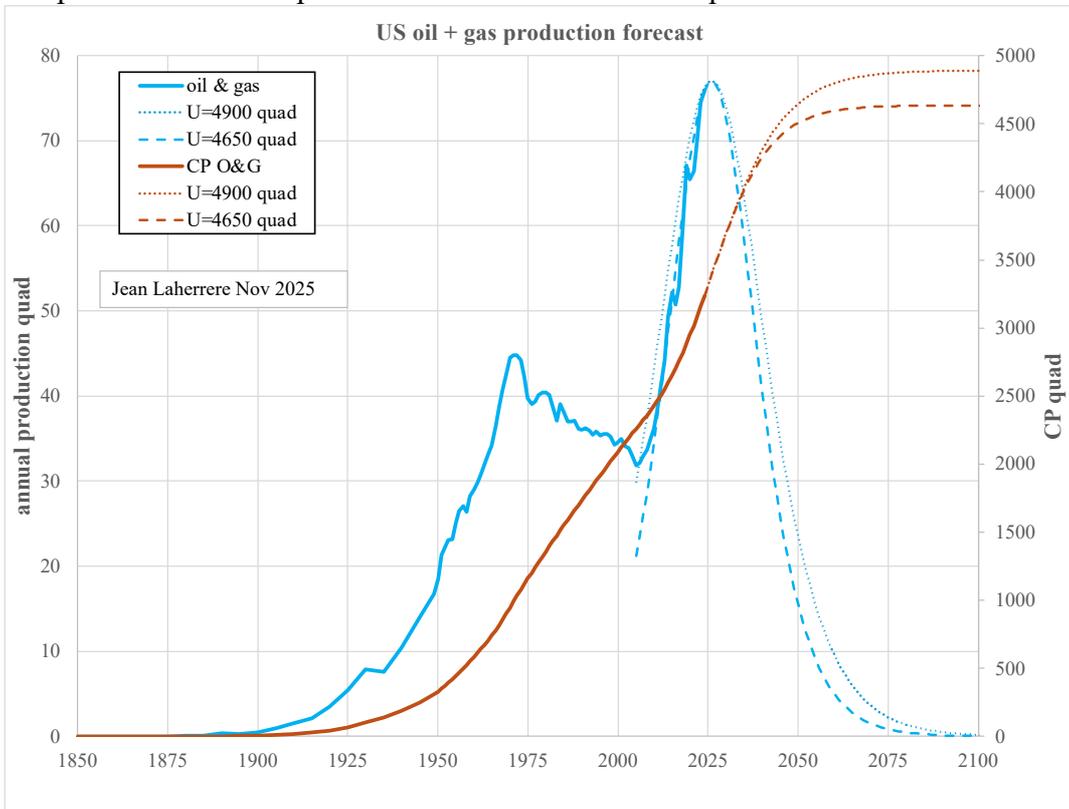
HL of US coal production trends towards 2100 quad



HL of US oil+gas production trends towards infinite

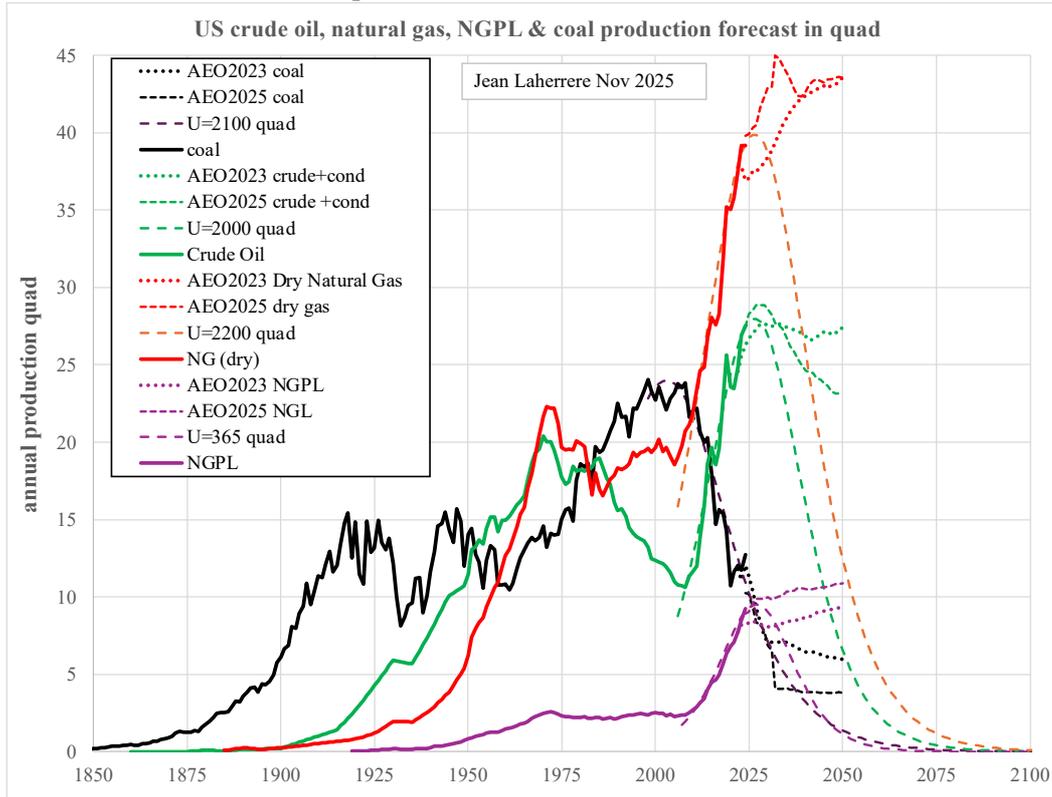


US oil+gas production is forecasted (best fit) with 4650 quad ultimate, with a peak in 2026 and a sharp decline: in 2050 production is forecasted to be equal to 1950!



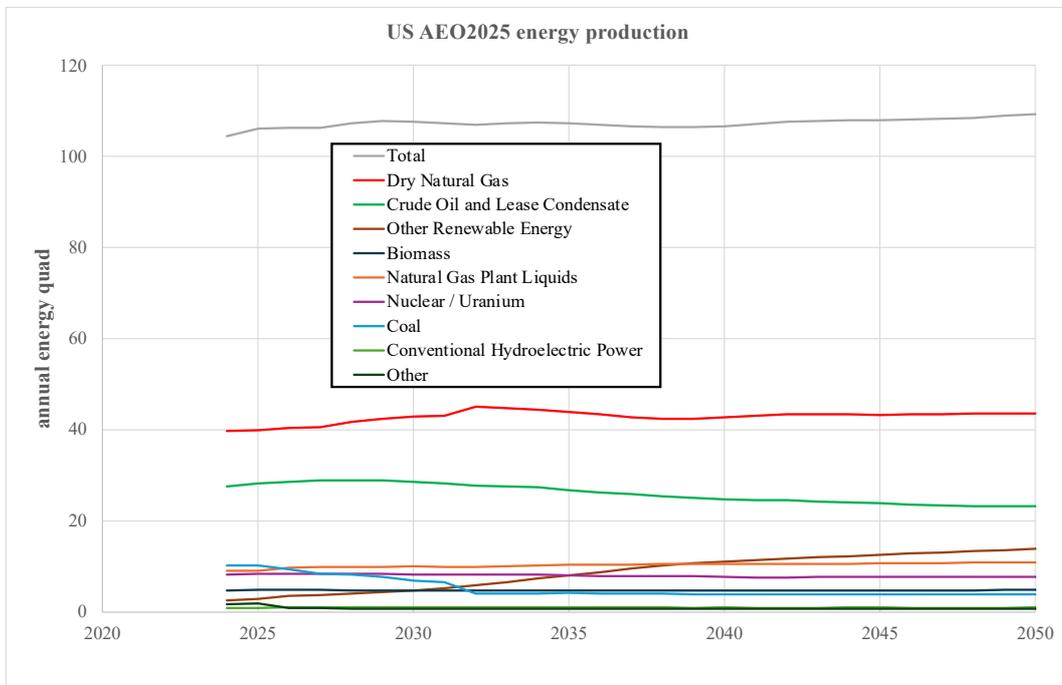
A 4900 quad ultimate is also displayed not far from 4650 quad!

My forecast on fossil fuel is compared with EIA forecasts AEO 2023 and AEO 2025



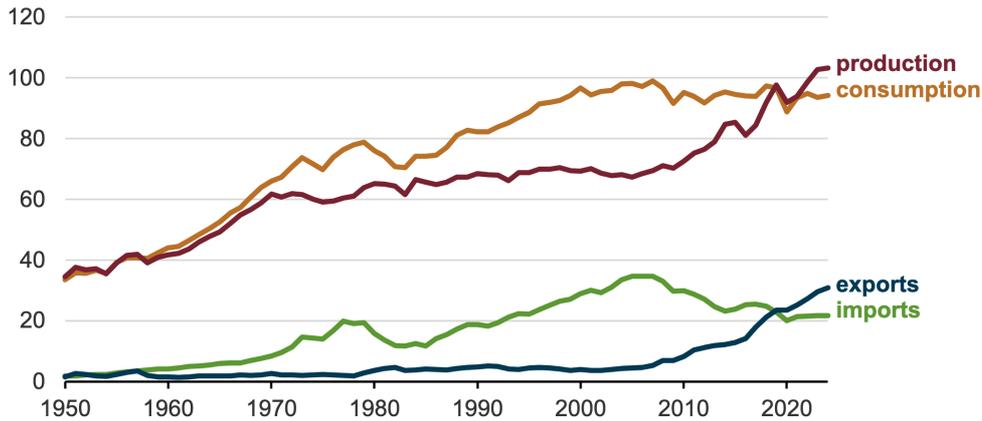
In 2050 EIA forecasts US NG production climbing at 43 Tcf when my forecast is only 13 Tcf

AEO2025 forecasts a decrease in crude production and a small increase in NG, the main increase is “other renewable”!



US production was lower than consumption up to 2022, in 2024 US exports energy, but it could be for a short time!

**U.S. primary energy production, consumption, imports, and exports (1950–2024)**  
quadrillion British thermal units

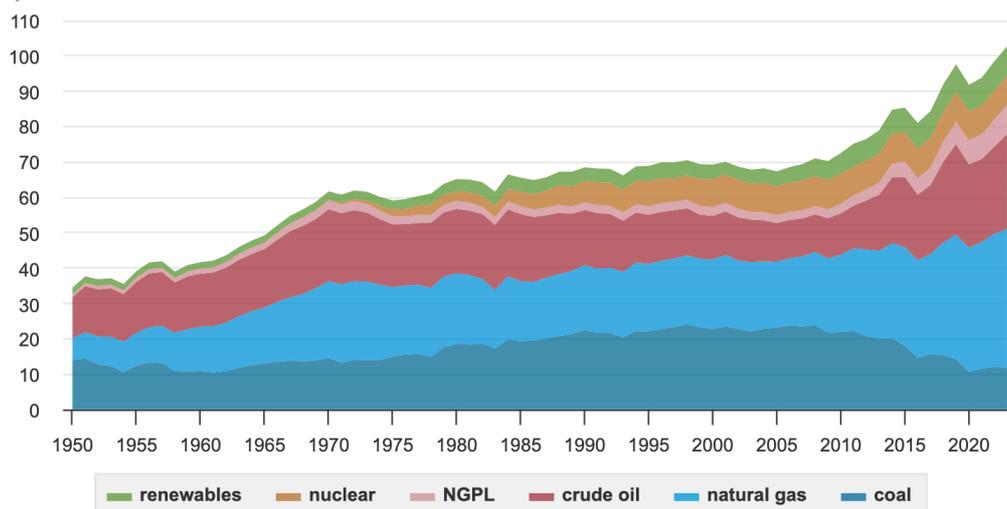


US primary energy production 1950-2023 in quad: the main production is from NG, followed by crude oil

**U.S. primary energy production by major sources, 1950-2023**



quadrillion British thermal units



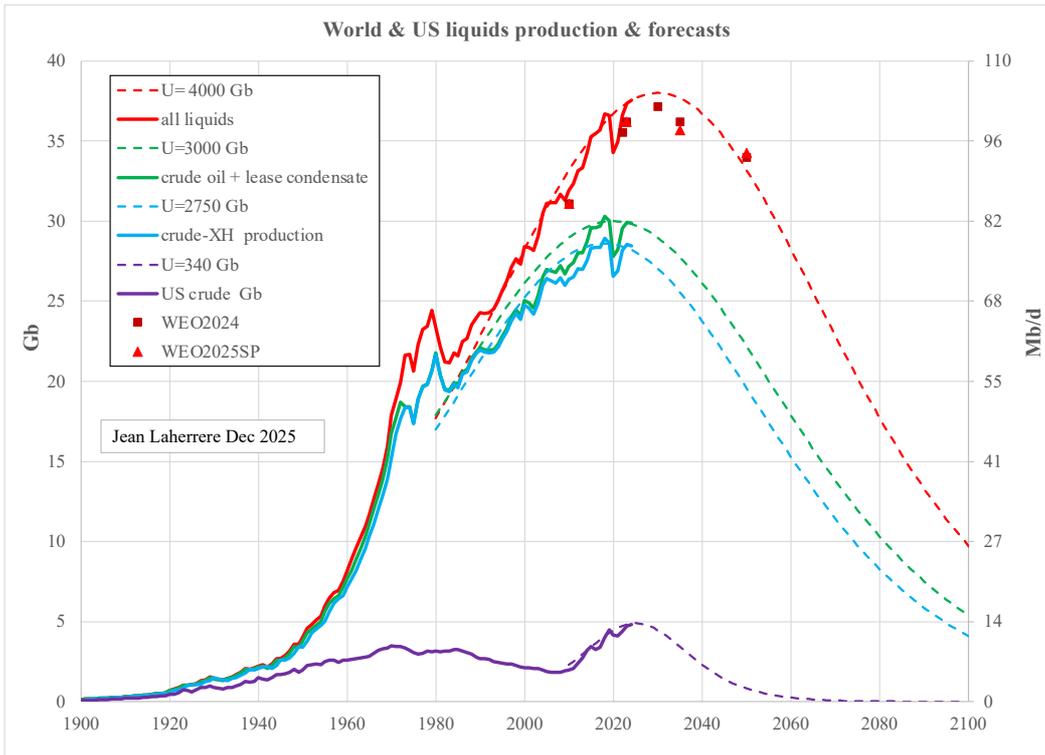
Data source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 1.2, April 2024, preliminary data for 2023



Note: NGPL=natural gas plant liquids

**-comparison with world oil production**

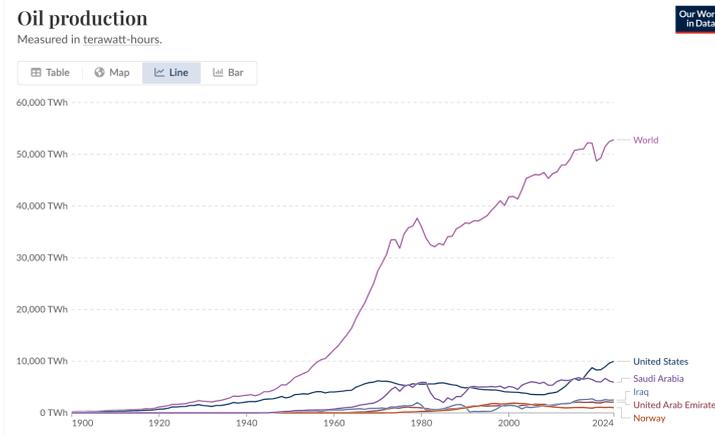
US crude oil production and forecast for U=340 Gb is compared with world oil production:  
US oil peak will occur after world oil peak!



Since 1950 the US production has lost being the largest because the OPEC production!

Our world in Data site displays this graph but without Russia [https://ourworldindata.org/grapher/oil-production-by-country?country=SAU~NOR~IRQ~USA~ARE~OWID\\_WRL](https://ourworldindata.org/grapher/oil-production-by-country?country=SAU~NOR~IRQ~USA~ARE~OWID_WRL)

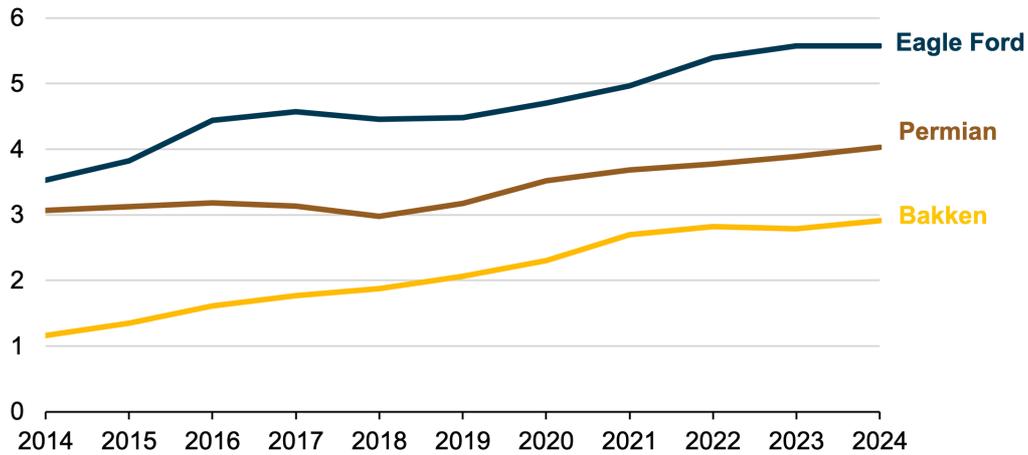
This graph is displayed in order to be compared with the previous one:



**-Gas to oil ratio = GOR**

EIA displays the GOR 2014-2024 of tight oil plays

**Average annual gas-to-oil ratios in select tight oil plays (2014–2024)**  
thousand cubic feet per barrel



**Data source:** U.S. Energy Information Administration, *Short-Term Energy Outlook*, October 2024 (Table 10b), and Enverus DrillingInfo  
**Note:** 2024 represents year-to-date data through September.

Eagle Ford is gassier than Bakken, Permian in the middle!  
GOR is increasing

**-Synthesis**

study	Gb oil	Gb crude	Gb LTO	Gb LTO	Gb Permian	Gb Eagle Ford	Gb Bakken	Gb Niobrara	Gb New Mexico	Gb GOM	Gb DM shall	Gb GOM dec	Gb Appalachia	Gb Haynesville	Gb Alaska	Gb NGL	Gb NGPL	Tcf NG mark	Tcf G tight w	Tcf G tight dry
aP2024 quad total																				
CP2024 quad total																				
aP2024 quad oil																				
CP2024 quad oil																				
aP2024 quad NG																				
CP2024 quad NG																				
aP2024 quad NGL																				
CP2024 quad NGL																				
ultimate crude Gb		295-340	68	70	30	10	10	3.6	13	35	13.5	21.5			26	94				
ultimate NGL Gb																				
ultimate NG Tcf					114	31							280	52	30-31			2300-2340	700	600
ultimate crude quad		2000																		
ultimate NGL quad																	365		2200	
ultimate NGPL quad		365																		
ultimate NG quad		2200																		

**-population & fertility & migration**

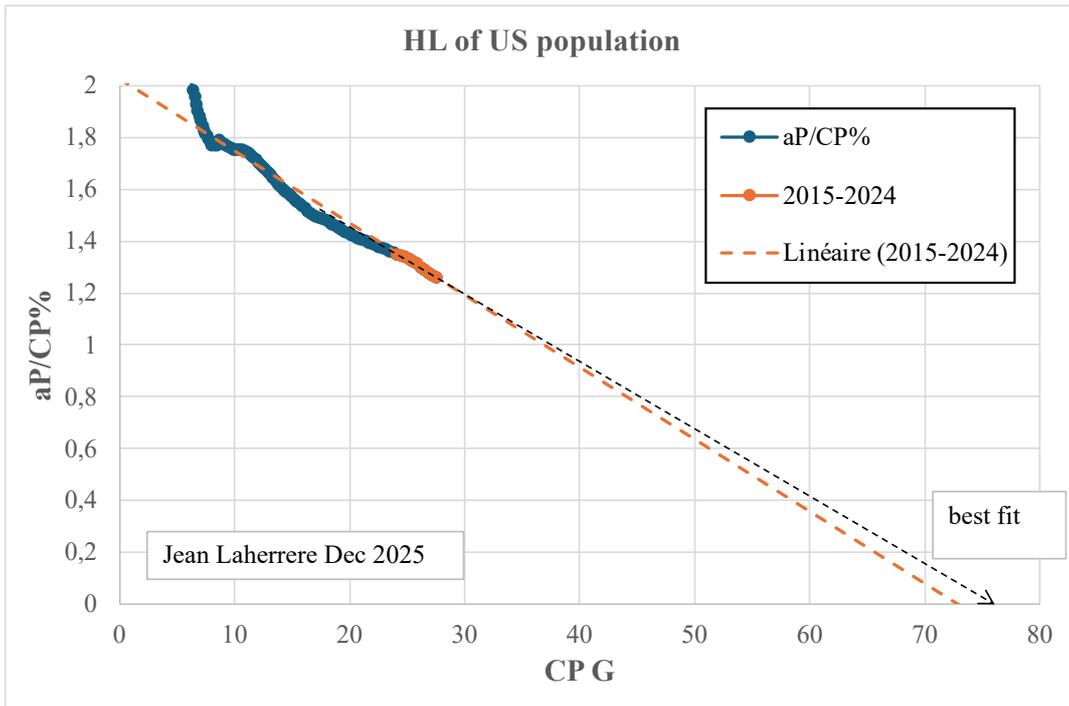
US population comes from Maddison and UN 2024

The population forecast is based on fertility and migration forecast!

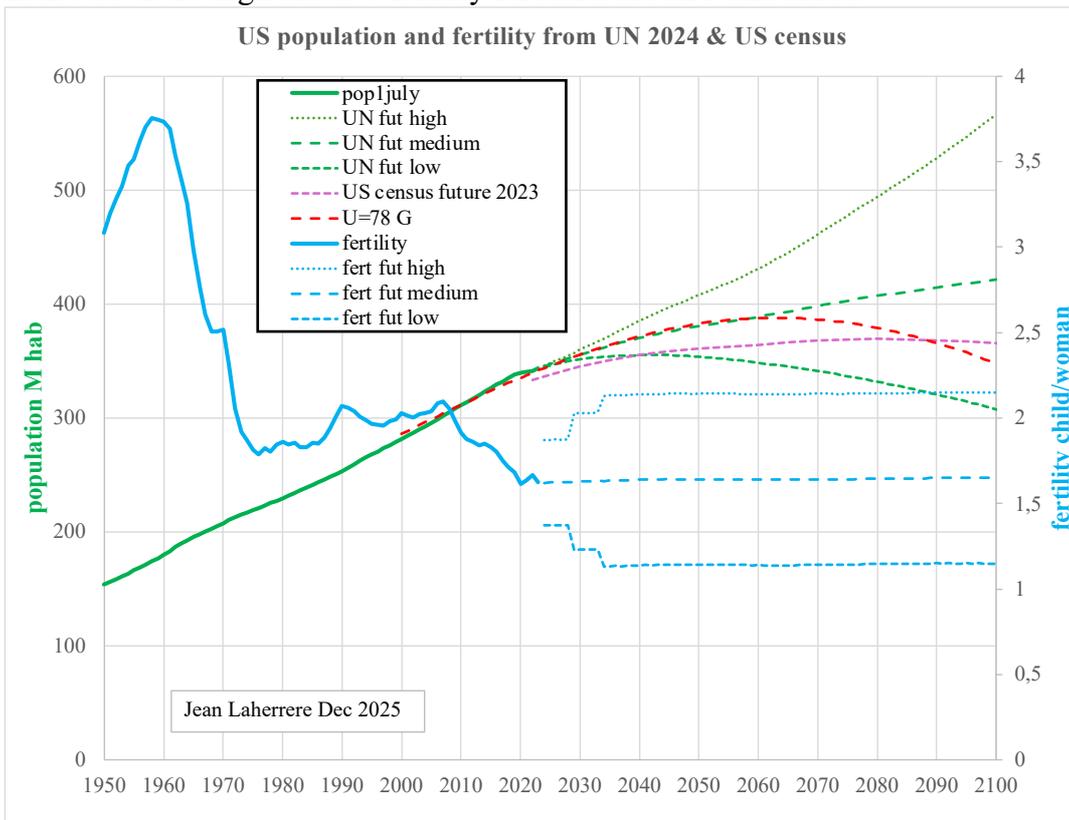
It is fairly easy to forecast fertility, but more difficult to forecast immigration, depending upon

US future policy on the matter, presently though with President Trump

HL of US population trends towards 78 G

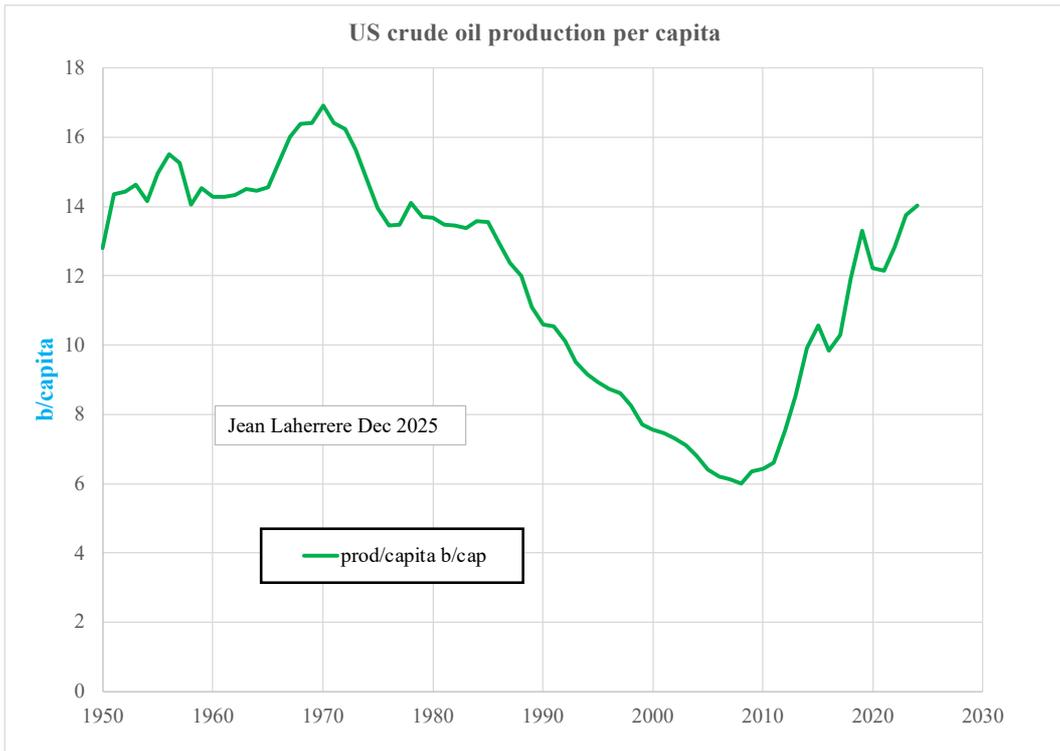


UN 2024 forecast is based on an unlikely constant fertility, when US census bureau is more pessimistic. UN 2024 high and low fertility forecasts are also unrealistic!



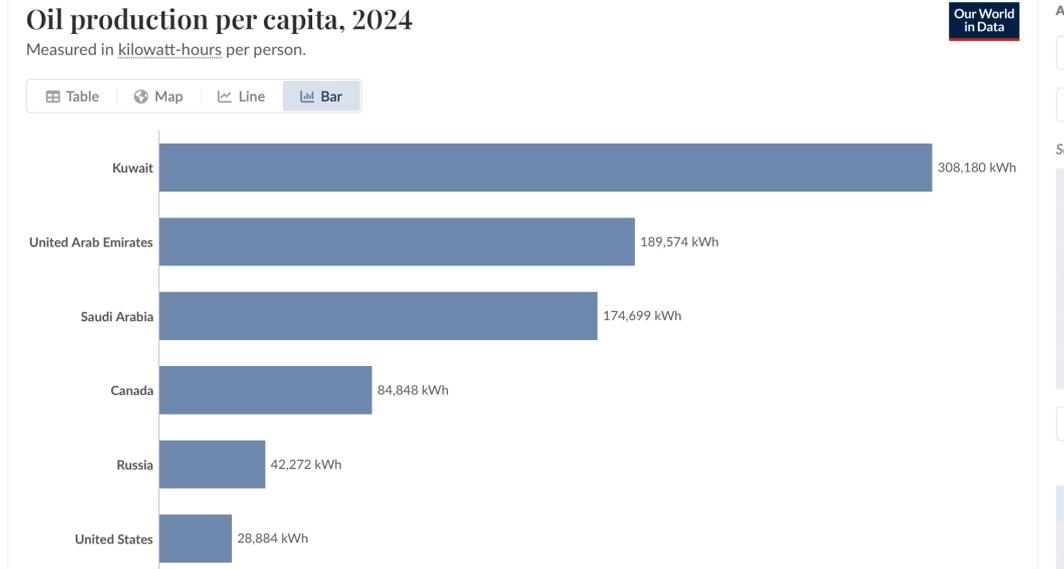
UN medium fertility forecasts a peak beyond 2100 when US census in 2080 and my forecast about 2065!

US crude oil production per capita 1950-2023

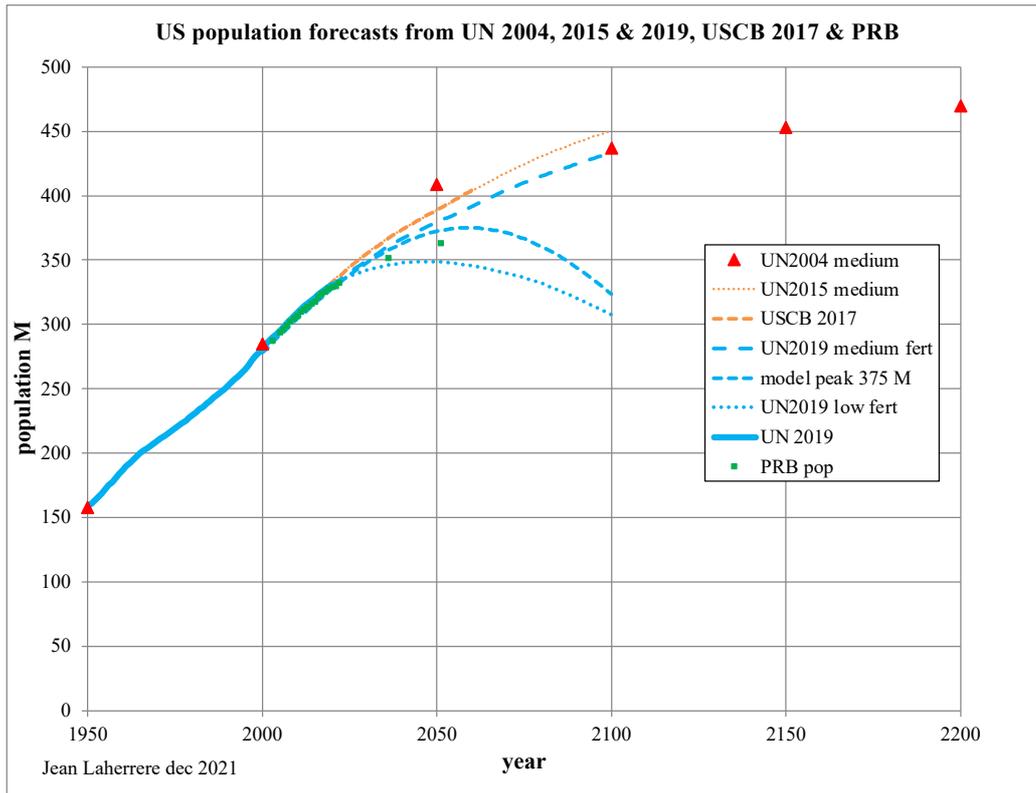


US crude oil production per capita was around 14 b from 1950 to 1985, declining to 6 b in 2008 and back to 14 in 2024

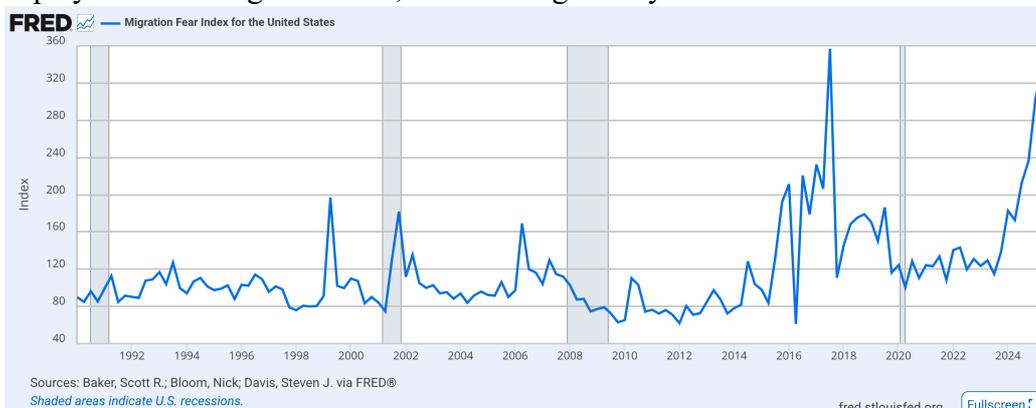
Our World in Data displays this graph in kWh <https://ourworldindata.org/grapher/oil-production-per-capita?time=2024> where the highest producer is Kuwait and US is sixth!



My old 2021 US population forecasts display a large range of forecasts

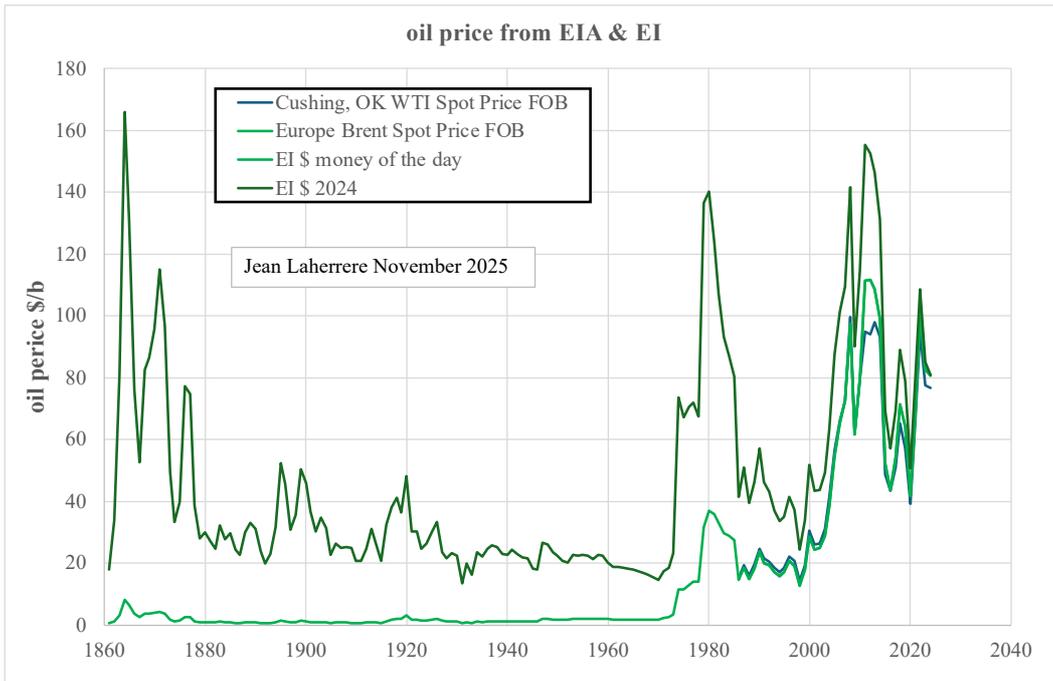


It is hard to forecast US migration policy, mainly with President Trump!  
 Fred displays this US migration fear, which is high today as in 2017:



### -oil and gas price

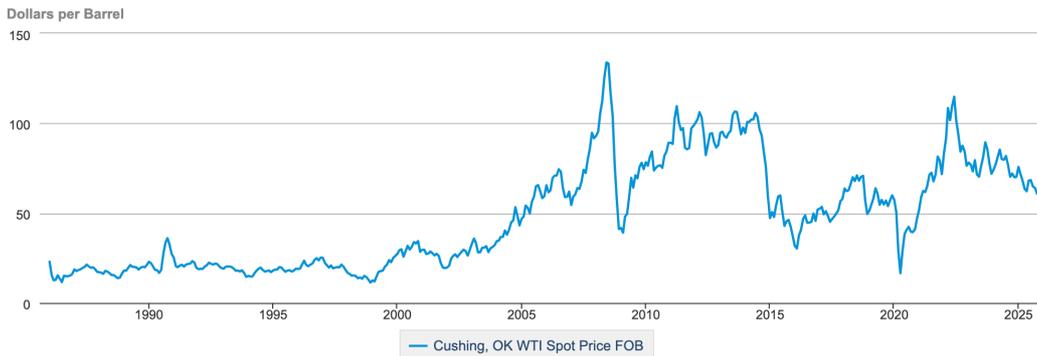
Oil price in money of the day and \$2024 for WTI & Brent



In 1864 oil price was 164 \$2024/b = double of 2024 price!

In 1980 oil price was 140 \$2024/b more than double of today oil price!

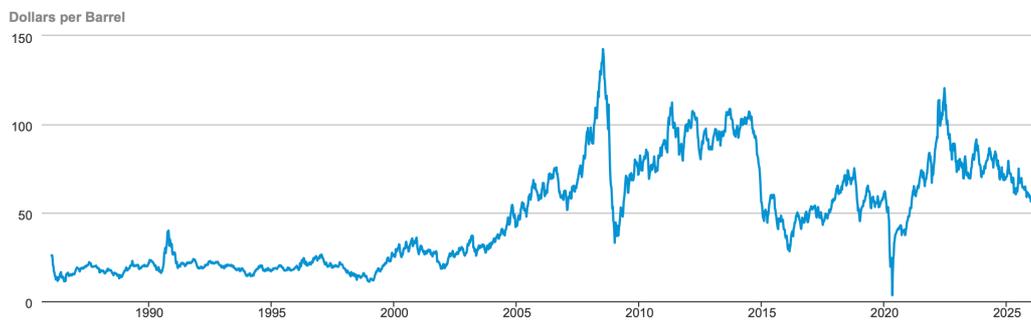
EIA Monthly WTI price 1986-2025 is falling since June 2022!



Weekly WTI very similar with monthly

Weekly Cushing, OK WTI Spot Price FOB

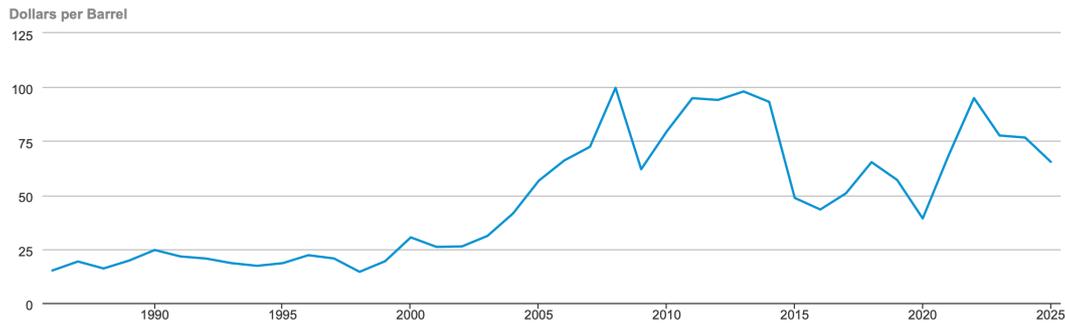
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Annual WTI gives the same display of change

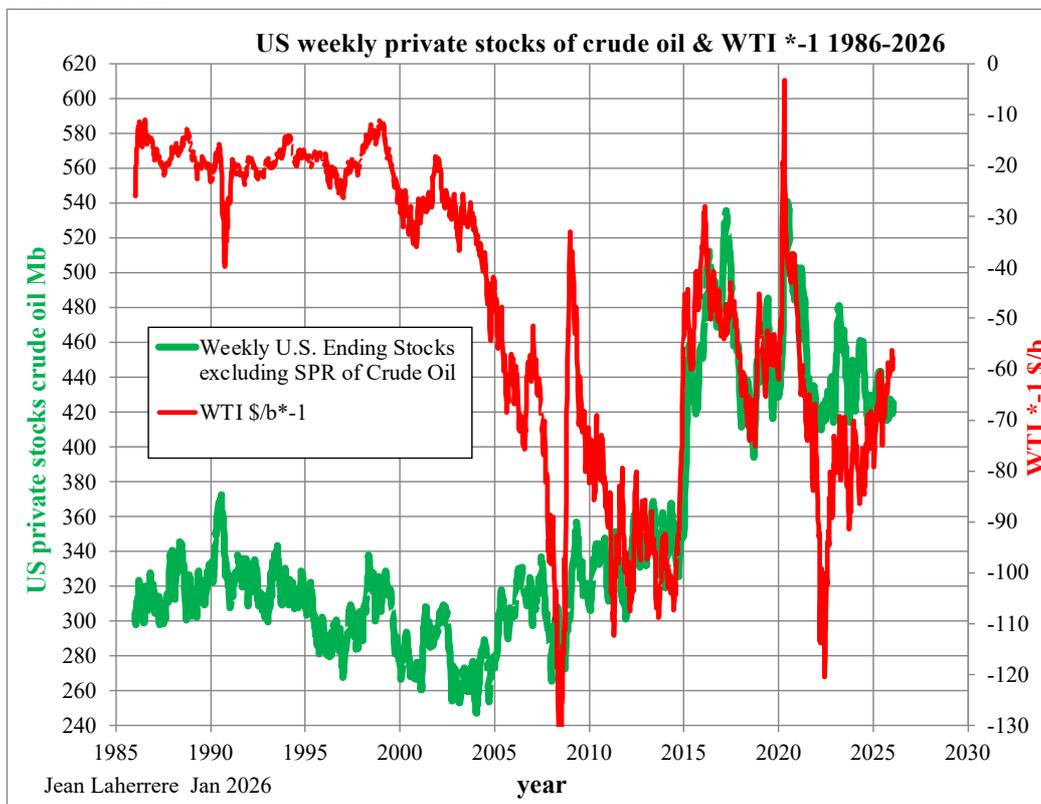
Cushing, OK WTI Spot Price FOB

DOWNLOAD



A new report from big energy data analytics firm Enverus finds that the average breakeven price for new shale wells in the United States currently sits at \$70 per barrel. 28 sept. 2025  
**Oil price is presently below LTO breakeven, meaning problem for the future of LTO!**

Since 2008 (LTO start) there is a fair relationship between negative weekly WTI price and US private crude stocks

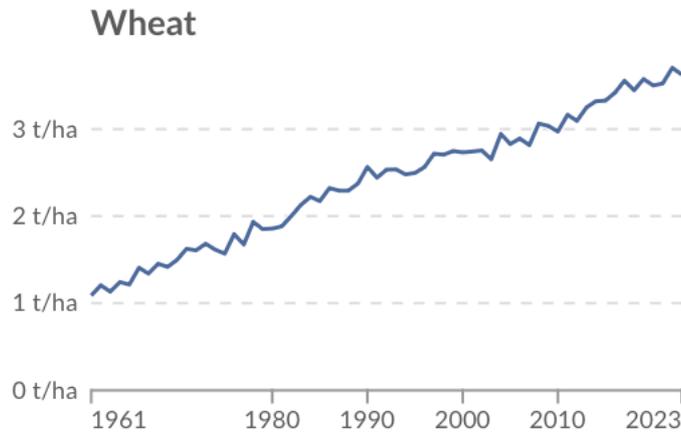


If US private crude stocks stay around 420 Mb, WTI would stay around 70 \$/b!

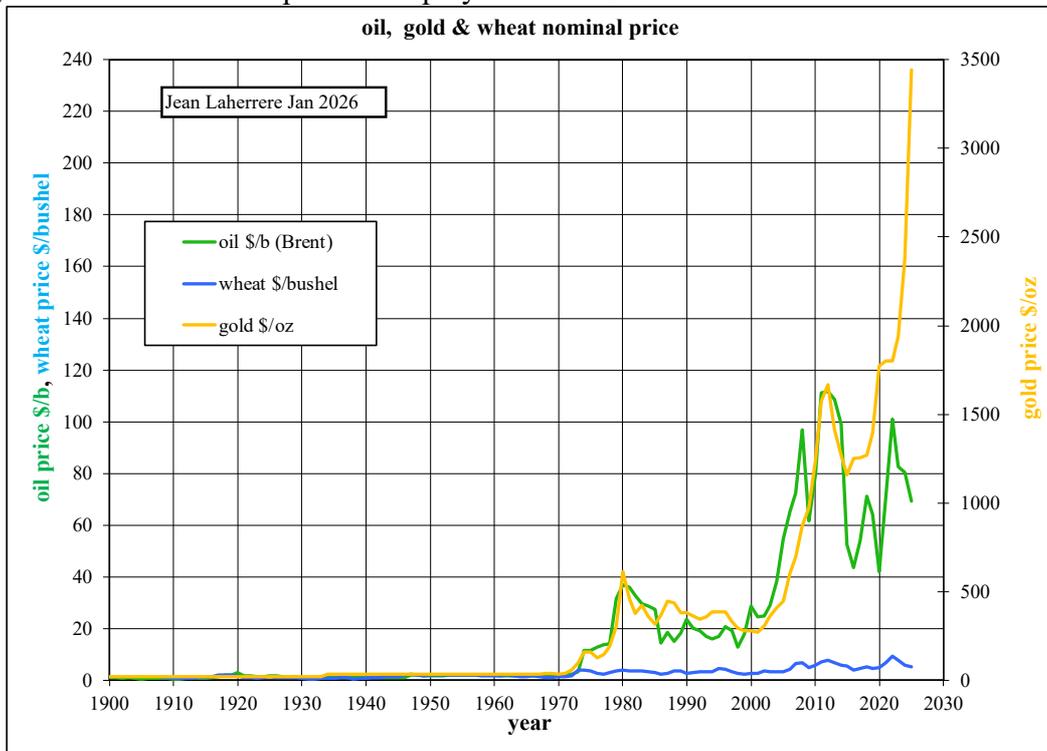
Gasoline country price [https://www.globalpetrolprices.com/gasoline\\_prices/](https://www.globalpetrolprices.com/gasoline_prices/)  
 Gasoline price in \$/liter ranges from 0.028 in Libya, 0.029 in Iran, 0.035 in Venezuela, 0,328 in Angola to 2.377 in Denmark, 2.884 in Malawi and 3.723 in Hong Kong  
 Diesel country price [https://www.globalpetrolprices.com/diesel\\_prices/](https://www.globalpetrolprices.com/diesel_prices/) ranges from 0.004 in Venezuela, 0.008 in Iran, 0.028 in Libya, 0.239 in Algeria to 2.279 in Switzerland, 3.657 in Hong Kong  
 The range is huge!

**-Oil, gold & wheat price**

Up to 1972, oil price in \$/b was close to wheat price in \$/bushel, after 1973 oil price jumped when wheat price stays low because world wheat yield (t/ha) increased linearly as shown by OWID 1961-2023, but where is the limit?



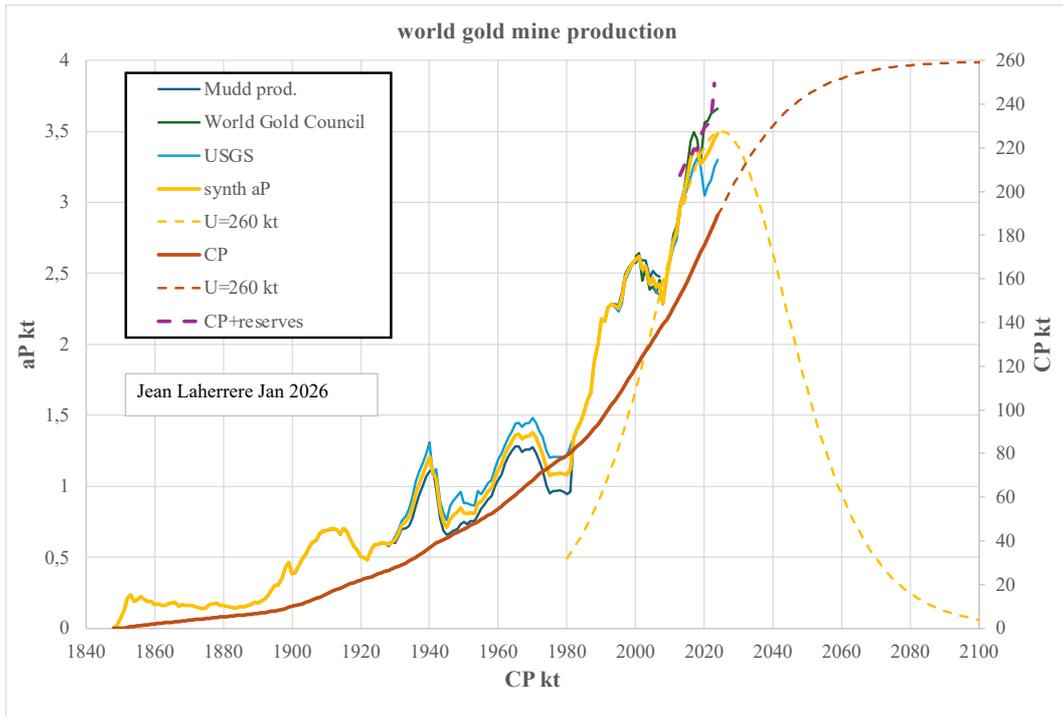
Oil, gold & wheat nominal price is displayed since 1900:



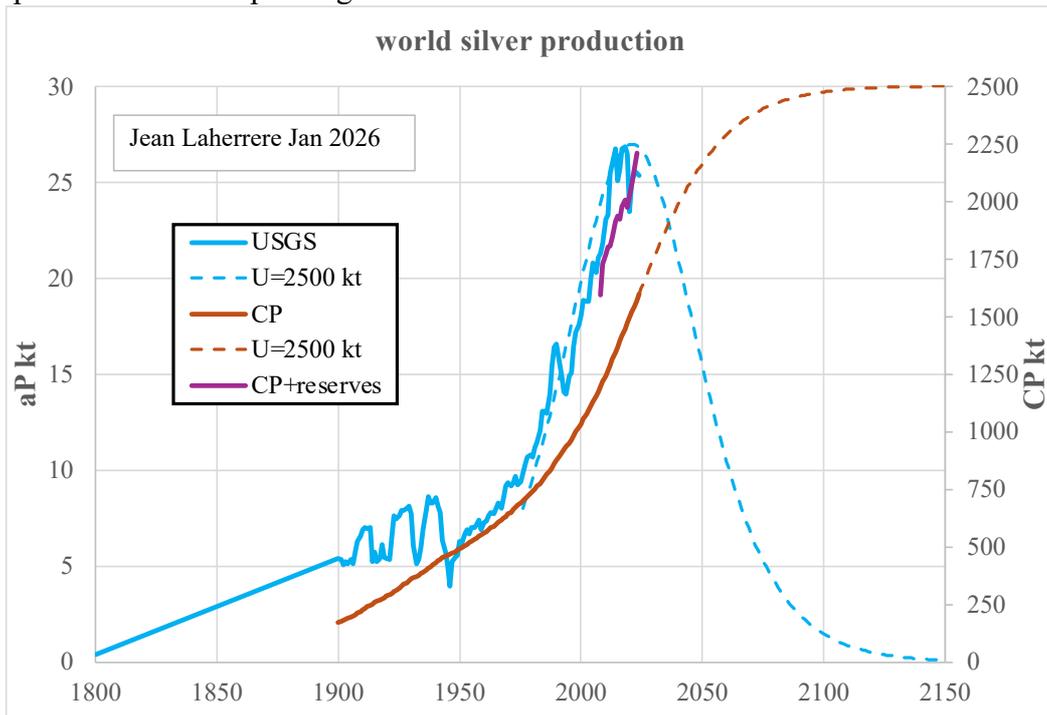
Gold price behaves as oil price up to 2020, but after gold price jumped to the sky, being today >5000 \$/oz !

**-Gold & silver production**

Gold production is presently peaking



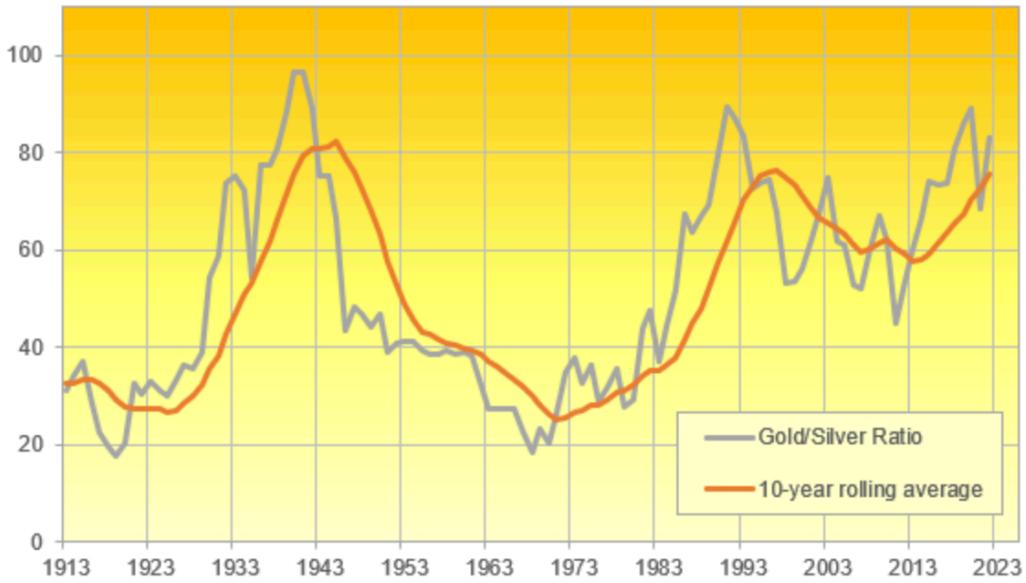
Silver production is also peaking



**-Gold/silver price ratio**

Gold price is very high today, as silver price, but the price ratio gold /silver behaves quitter!  
 The site <https://www.bullionvault.com/silver-guide/gold-silver-ratio> displays this gold/silver price ratio from 1913 to 2023 ranging from 30 to 80, but it was 20 in 1970!

### Gold/Silver Ratio since 1913



Source: BullionVault via US Mint, USGS, LBMA, T.Green, F.O'Connor

Today this ratio is lately falling on the last 3 years graph!

<https://www.bullionbypost.eu/price-ratio/gold/silver/3year/#show-ratio-chart>

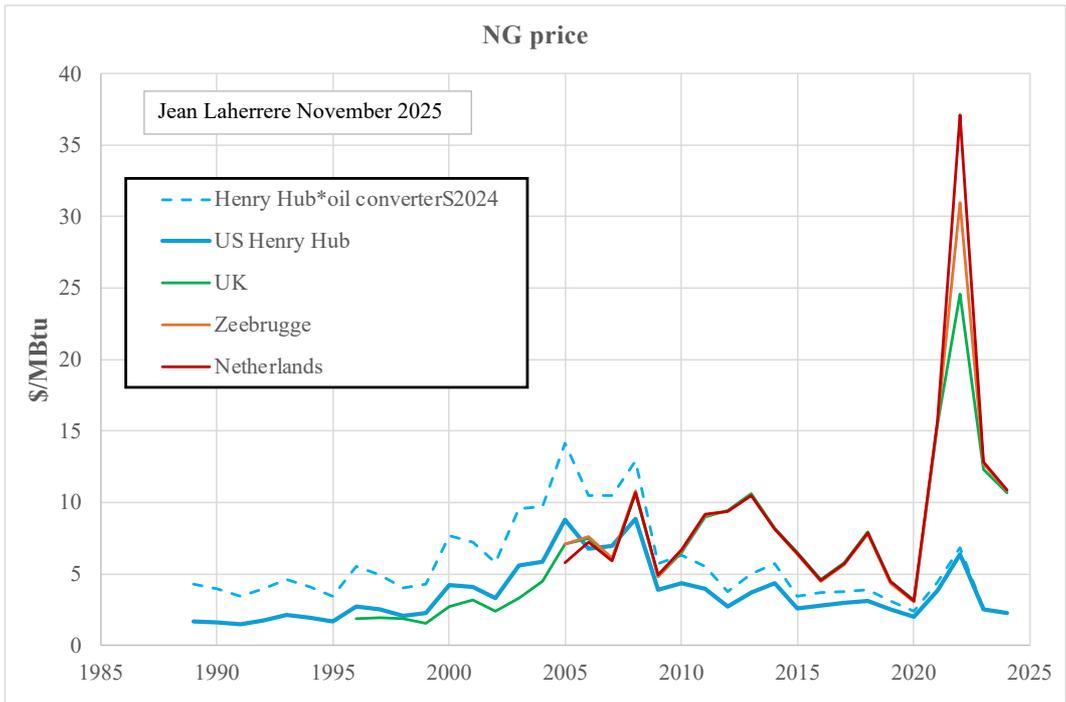


### -NG price

NG price is displayed 1984-2024 for Henry Hub in US, UK, Belgium and Netherlands, Henry Hub is reported in \$2024 using EI oil converter

Henry Hub is worth 2.2 \$/kWh in 2024 but 4.3 \$2024/kWh

NG price is declining, worth in 2005 8.8\$ or 14 \$2024/kWh



In 2022 NG price jumped in the world except in the US!  
**Since 2022 US gas price is four times lower than in the rest of the world**

Henry Hub price is presently increasing. Since 2024 price bursts have short life!

### Natural gas spot prices (Henry Hub)

dollars per million British thermal units



Data source: Natural Gas Intelligence

Henry Hub weekly price 1997-2025

### Henry Hub Natural Gas Spot Price

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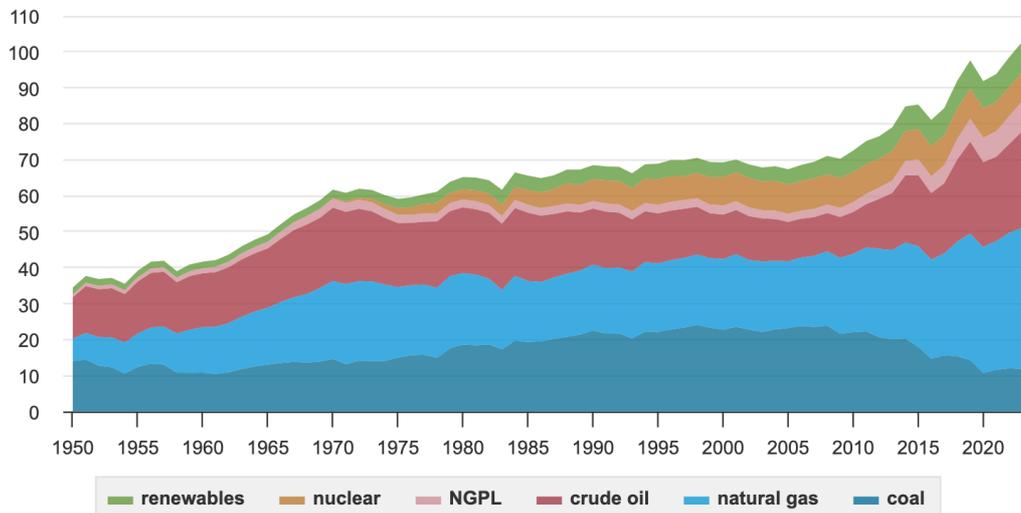
Dollars per Million Btu



The US using NG for about one third of the energy has a huge energy advantage compared with the rest of the world: when is the end of US cheap natural gas?

### U.S. primary energy production by major sources, 1950-2023

quadrillion British thermal units

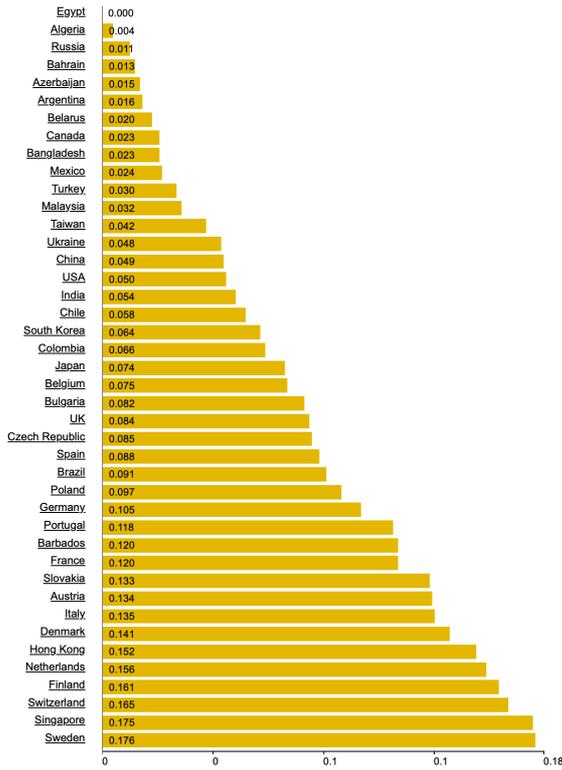


Data source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 1.2, April 2024, preliminary data for 2023

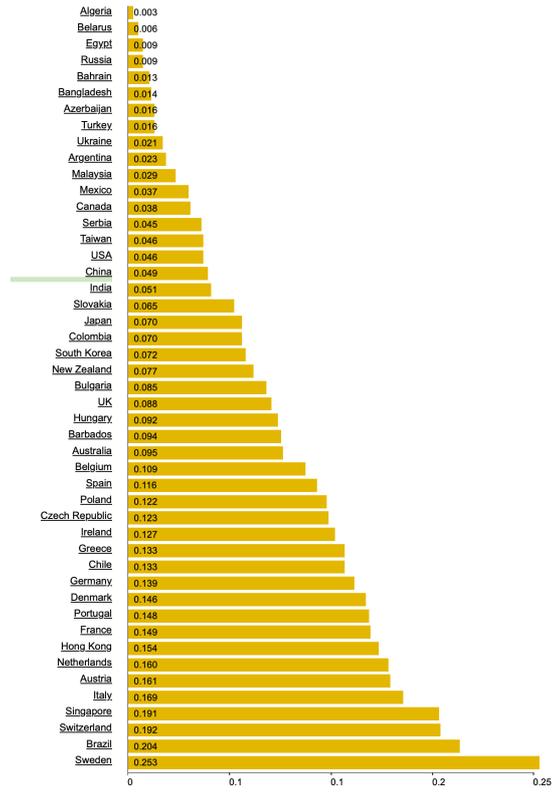
eia Note: NGPL=natural gas plant liquids

In 2025 NG country price for business and for household is reported by [https://www.globalpetrolprices.com/natural\\_gas\\_prices/](https://www.globalpetrolprices.com/natural_gas_prices/) and the range is huge from 0.000 \$/kWh in Egypt to 0.176 \$/kWh in Sweden for business with 0.050 \$/kWh for the US (rank 16th) from 0.003 \$/kWh in Algeria to 0.253 \$/kWh in Sweden for households with 0.048 \$/kWh (rank 16th) for the US

Natural gas prices for business, March 2025  
(kWh, U.S. Dollar)



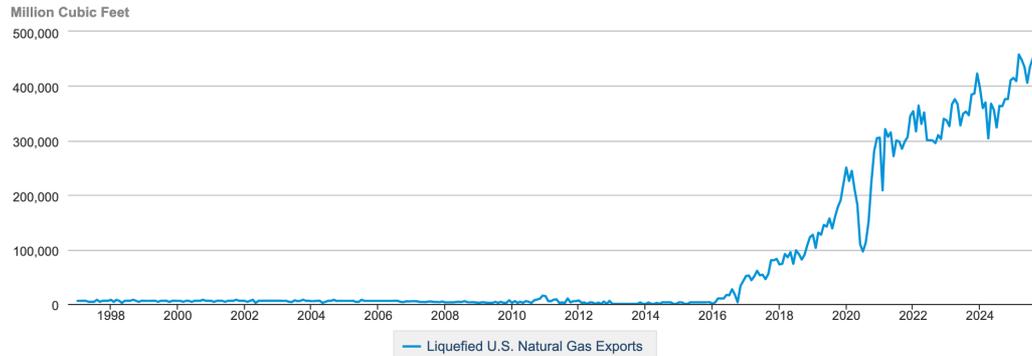
Natural gas prices for households, March 2025  
(kWh, U.S. Dollar)



-LNG = Liquefied Natural Gas = methane at -162°C  
US LNG export started really in 2016, today at 0.45 Tcf

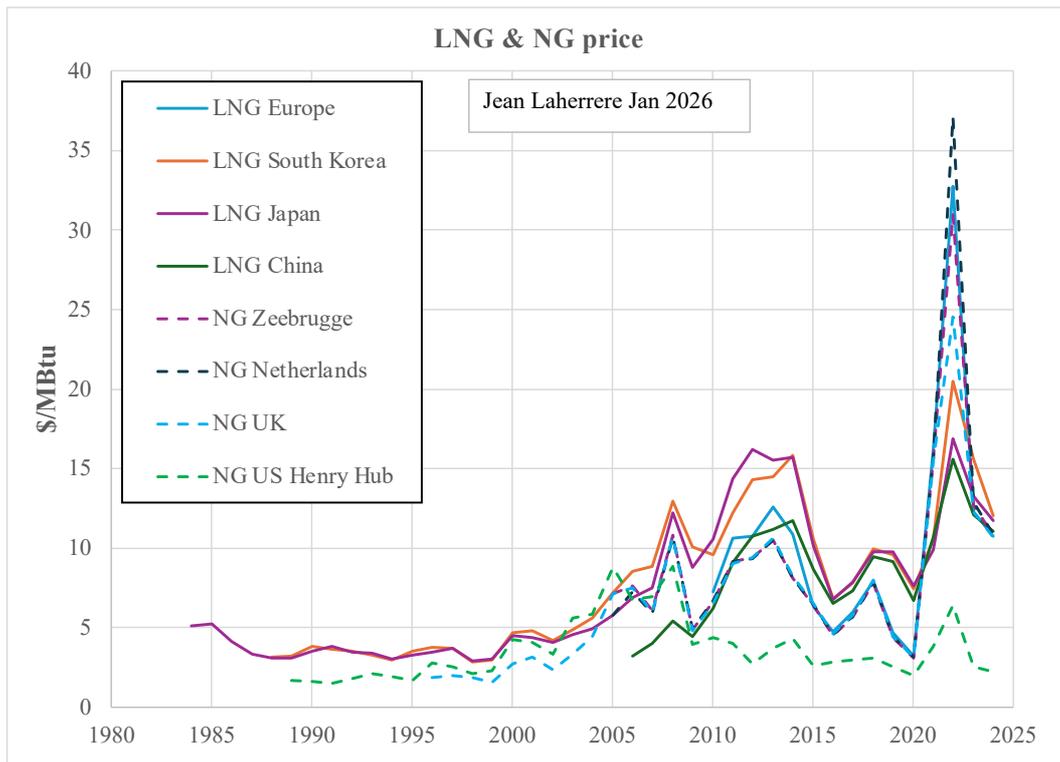
Liquefied U.S. Natural Gas Exports

[DOWNLOAD](#)



Data source: U.S. Energy Information Administration

LNG & NG price



After a sharp burst in 2022 LNG price is in 2024 as in 2014!  
 US NG price is obviously very low compared with the rest of the world

**-conclusion**

US oil production data is reported by EIA from estimates, and some data could be poorly reported. Then EIA data is poorly reliable!

GoM data reported by BOEM looks more reliable coming from fields real data up to 2019, but since 2020 the data is missing! It is very disappointing!

Modelling is based on symmetry of future decline with past increase, based on the large number of fields and producers and by the past production of US less Alaska + GoM + LTO. Thanks to hydraulic fracking, since 2008 oil and NG production are bursting but, after peaking now, their decline will be as sharp as their increase.

In 2050 oil production will be as in 1935 and NG production as in 1955!

EIA forecasts are more optimistic than mine.

President Trump' claim: "drill baby drill" will not succeed in fighting the coming US oil sharp decline.

US oil price is presently below LTO breakeven, meaning problem for the future of LTO!

US NG price is four times cheaper than the rest of the world = huge advantage, as NG represents one third of US energy production!

**NB** I use SI (Systeme International) symbols

[https://en.wikipedia.org/wiki/International\\_System\\_of\\_Units](https://en.wikipedia.org/wiki/International_System_of_Units)