



Art Berman

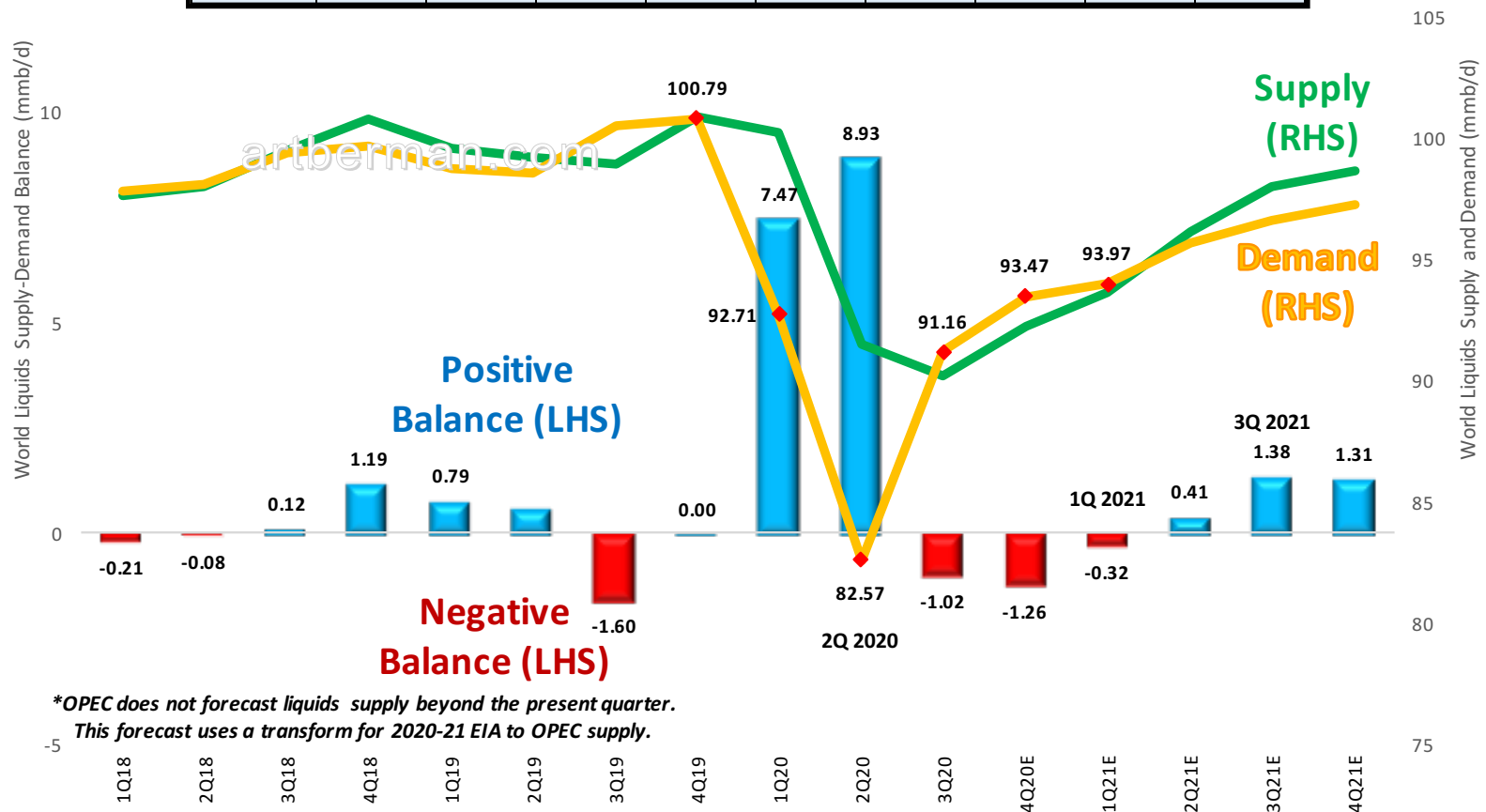
MacroVoices January 7, 2021



Saudi Arabia's solo production cut probably is because their demand forecast for 2021 has decreased from this December estimate

OPEC-EIA* expects a -0.32 mmb/d world supply-demand deficit in 1Q 2021 but a surplus for the rest of 2021 reaching a maximum of +1.38 mmb/d in 3Q 2021

mmb/d	3Q2020	4Q2020	2H2020	1Q2021	2Q2021	1H2021	3Q2021	4Q2021	2H2021
SUPPLY	90.14	92.21	91.18	93.65	96.08	94.87	97.94	98.60	98.27
DEMAND	91.16	93.47	92.31	93.97	95.68	94.82	96.57	97.29	96.93
S-D BALANCE	-1.02	-1.26	-1.14	-0.32	0.41	0.05	1.38	1.31	1.35



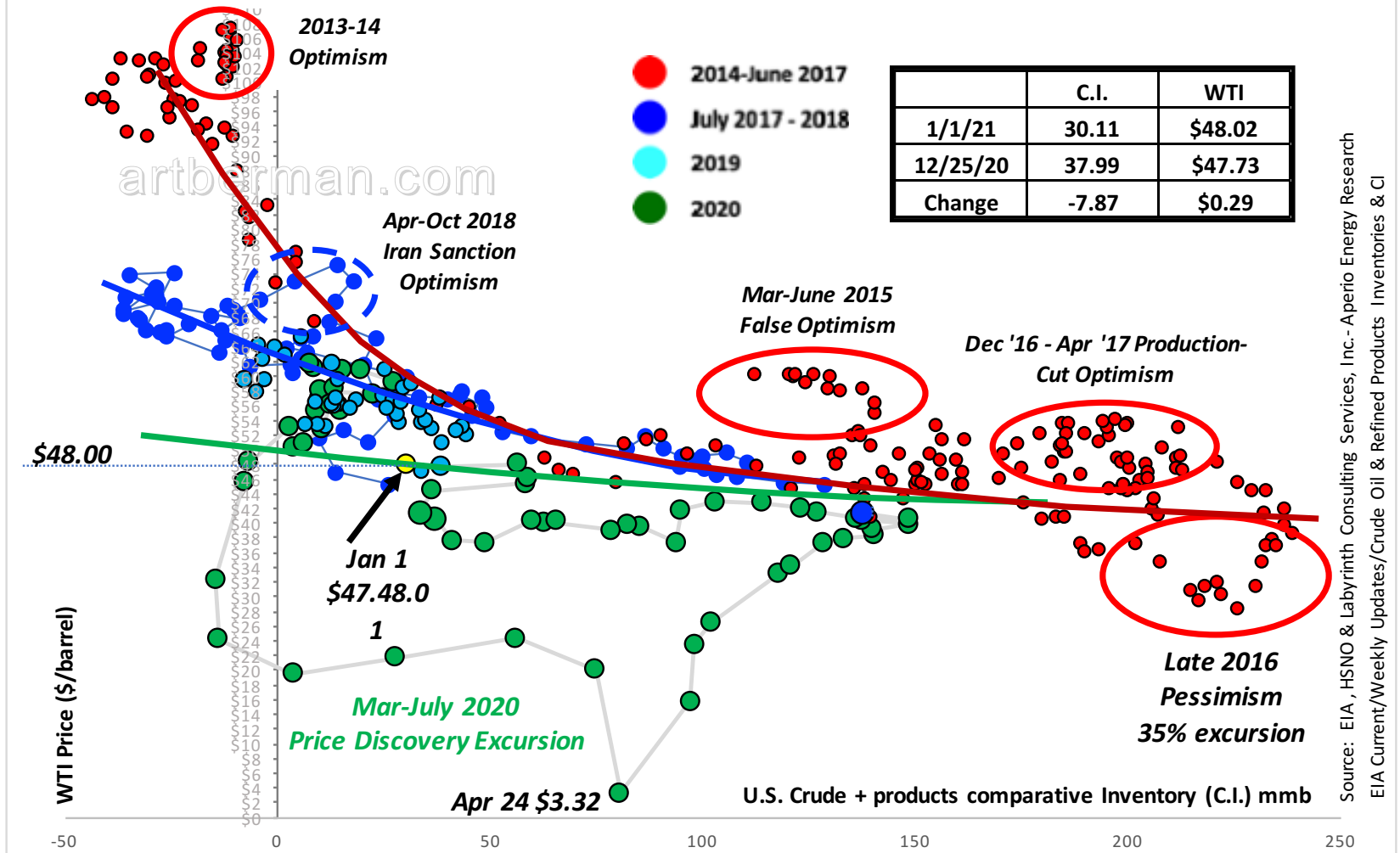
**OPEC does not forecast liquids supply beyond the present quarter.
This forecast uses a transform for 2020-21 EIA to OPEC supply.*

Source: OPEC, EIA & Labyrinth Consulting Services, Inc.

OPEC/Market Indicators/ OPEC Supply Demand Master

WTI is correctly priced at \$47 spot price
It is almost \$4 over-priced at \$50.80 futures price

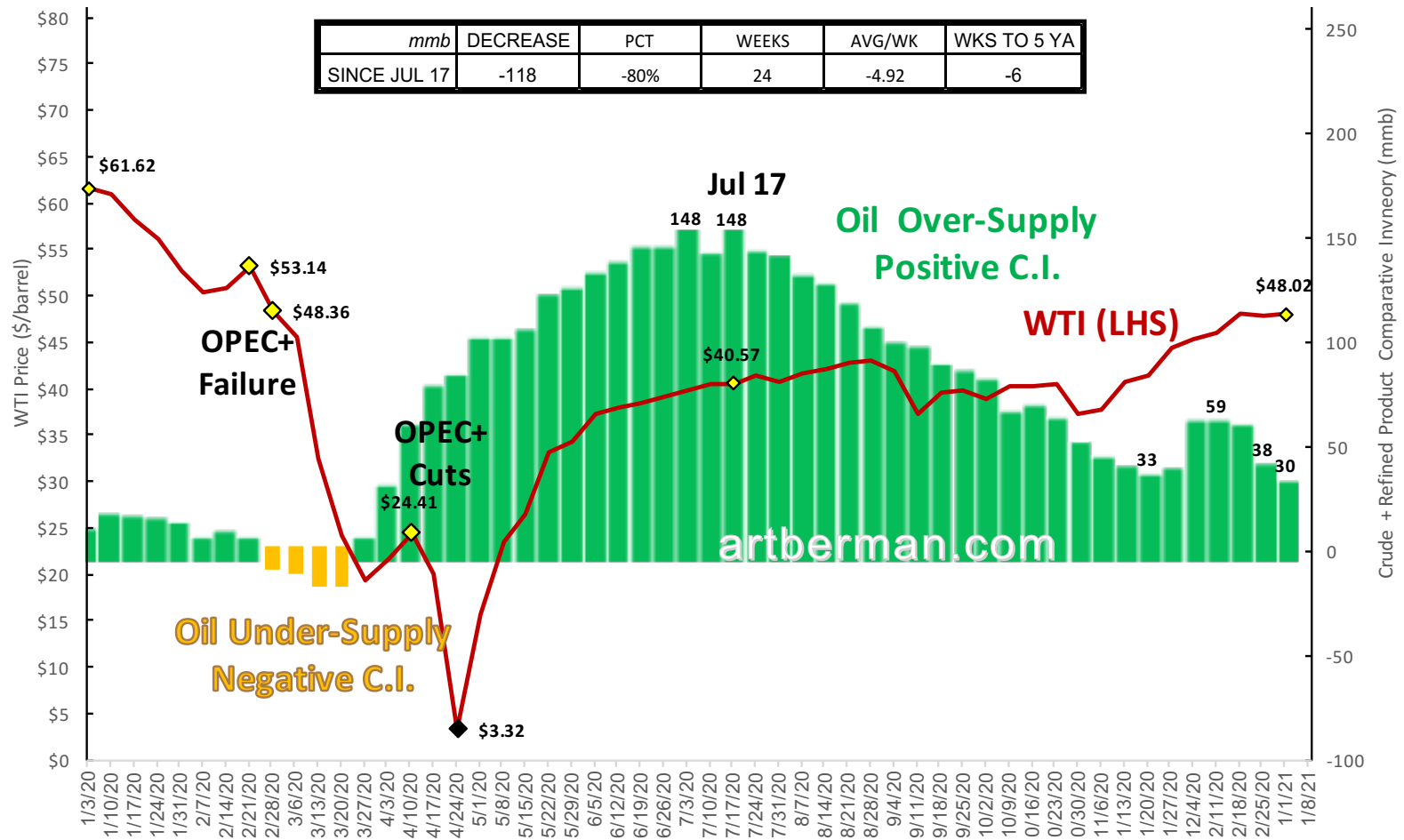
WTI spot is correctly priced at weekly avg price of \$48.02 week ending January 1
Futures price of \$50.42 is about \$2.50 over-priced



WTI comparative inventory should reach the 5-year average during Q1 2021

Decline since mid-July resumed in mid-December after a 3-week increase

Comparative Inventory decreased for third week in-a-row
6 weeks for C.I. to reach 5-year average at -4.9 mmb/week mean decline rate



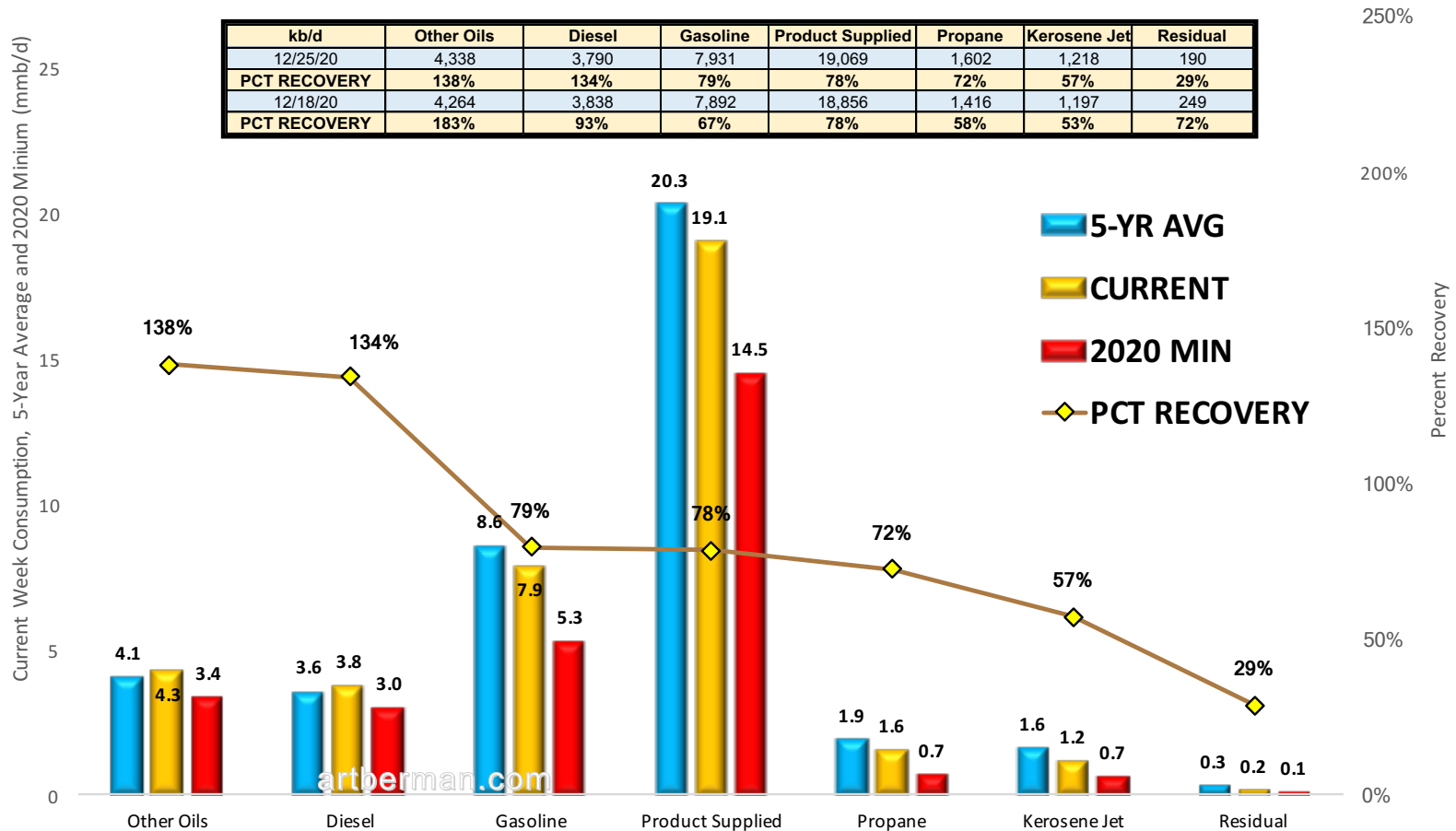
Source: EIA & Labyrinth Consulting Services, Inc.

EIA Current/Weekly Updates/Crude Oil & Refined Products Inventories & CI

U.S. consumption recovery reached a maximum of 84% in November but has been lower since then

Gasoline recovery is the main obstacle

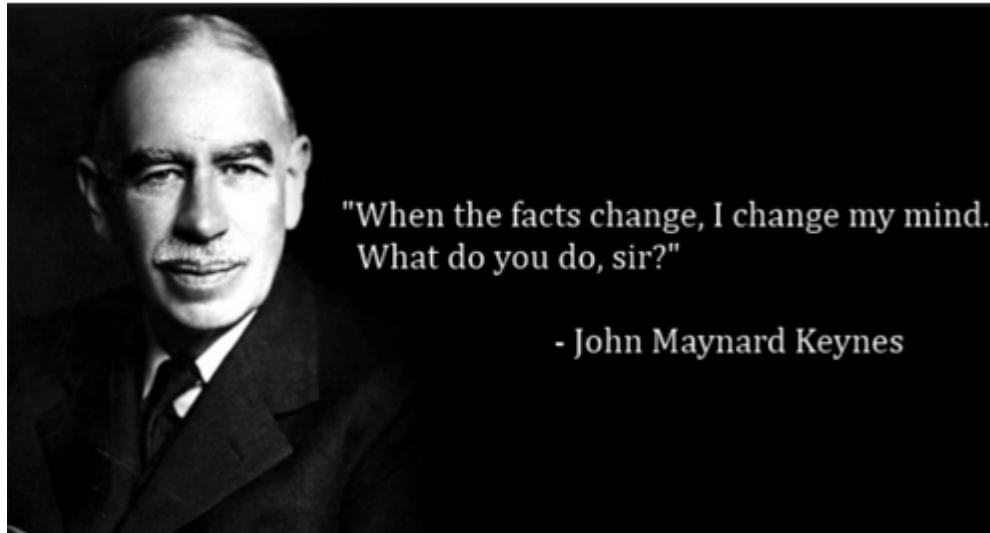
U.S. refined product consumption recovery rose from 73% to 79%
Diesel and other oils have recovered to more than their 5-year averages
Gasoline, residual, propane, jet fuel & residual remain less than their 5-year averages



Source: EIA & Labyrinth Consulting Services, Inc.

EIA Current/Weekly Updates/Product Supplied Weekly

U.S. production forecast update

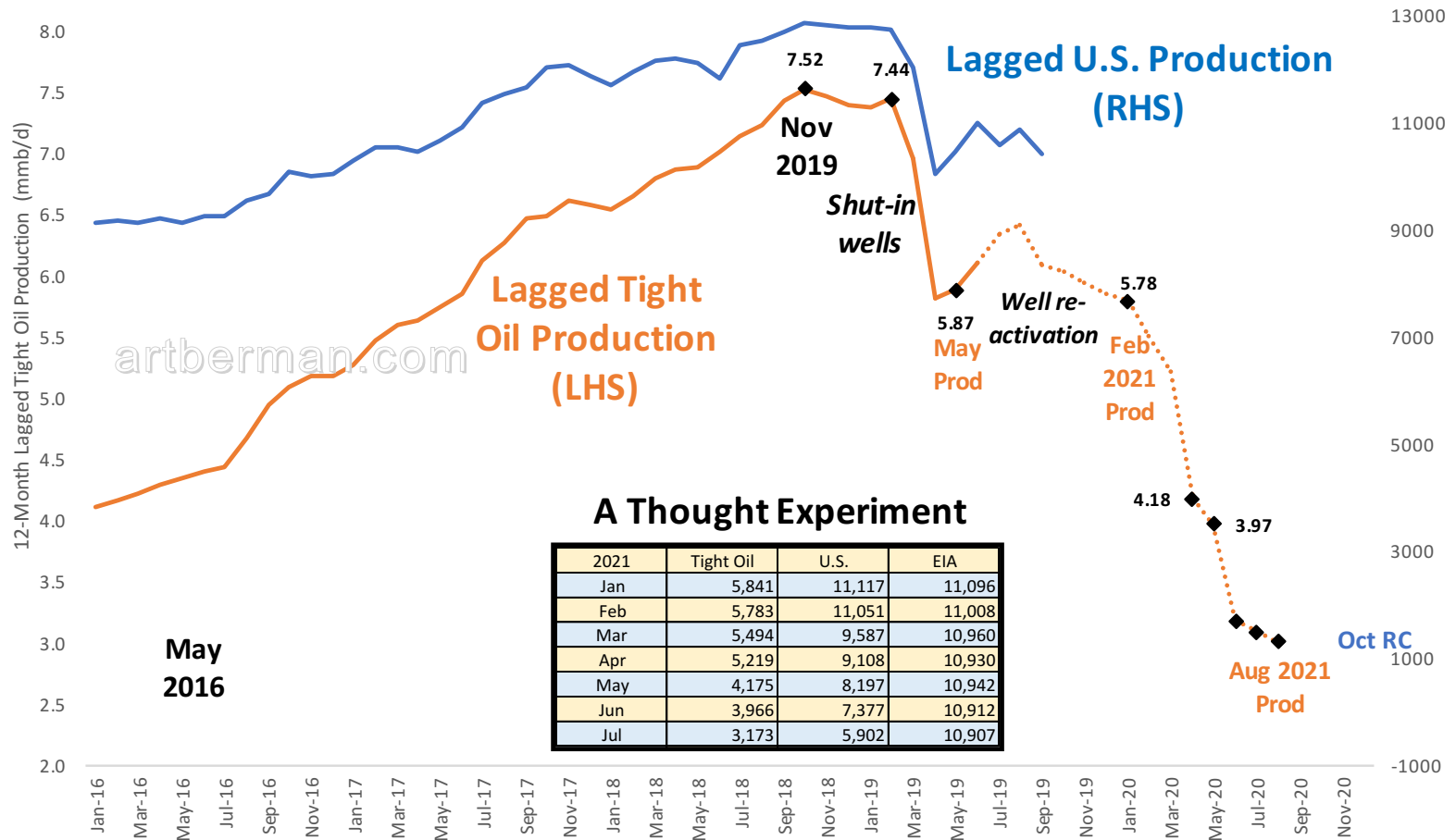


- My earlier “thought experiment” forecast for lower U.S. production in late 2020 was wrong.
- It was wrong because more shut-in wells were reactivated than I expected.
- It was wrong because it was based on tight oil decline extrapolated to all U.S. production.
- The model was too closely tied to the rig count decline curve.
- Current forecast used all wells from the 4 states + Gulf of Mexico that account for 80% of U.S. production.
- It was carefully calibrated with production decline, number of producing wells, rig count and DUCs.
- Output decline has begun but more serious decline begins in late Q1 early Q2 2021.
- Three cases suggest minimum rates of 7.8 to 9.9 mmb/d by Q3 2021.

Comparison of earlier tight oil forecast with observed total U.S. output to-date

October tight oil rig count is 157, 35% of 450 rigs needed to maintain
5.5 mmb/d tight oil/11 mmb/d total U.S. output

Tight oil output may decline to 3.5 mmb/d & U.S. to 6.5 mmb/d in Q3 2021

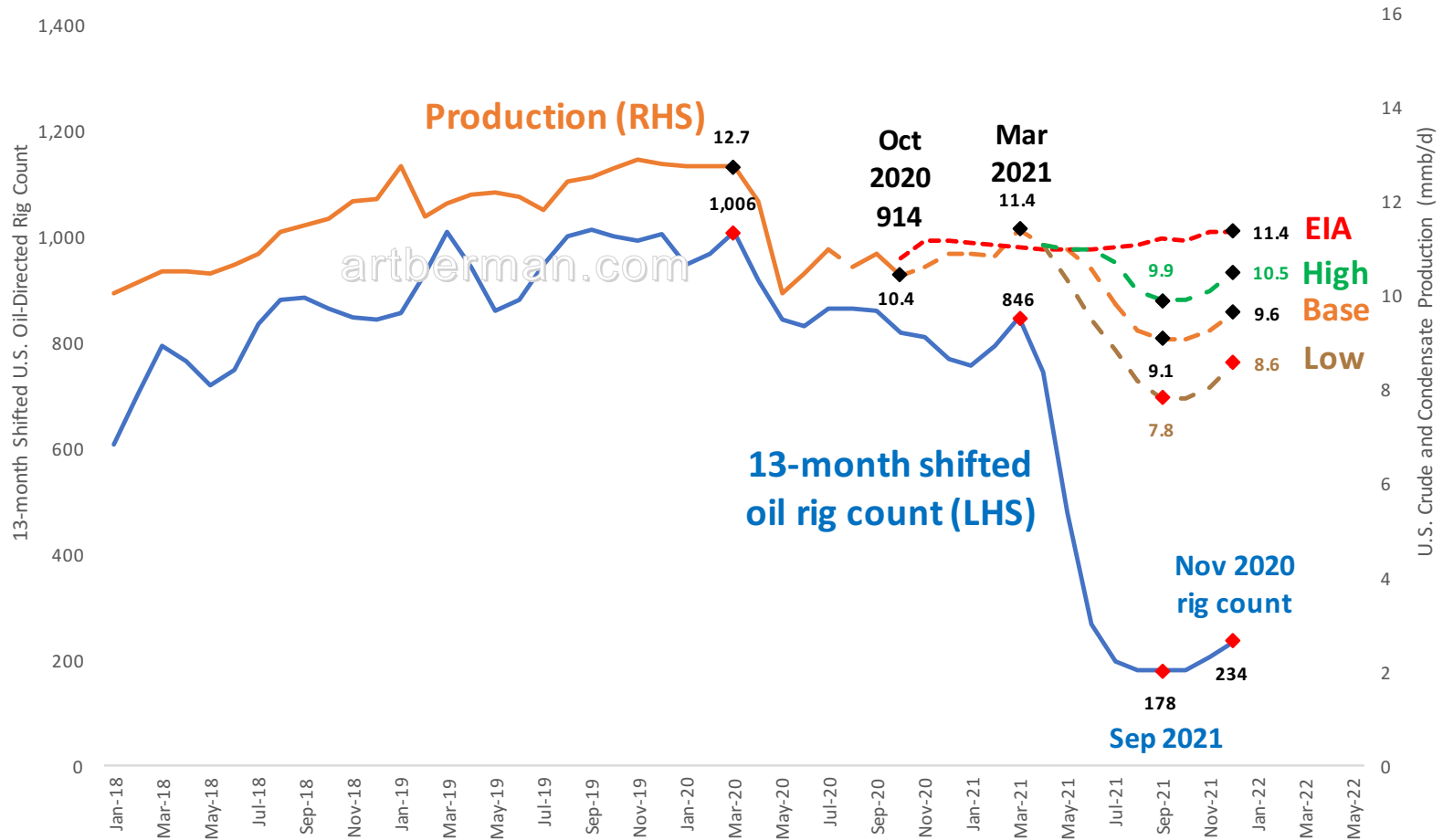


Source: Baker Hughes, EIA DPR, Enverus & Labyrinth Consulting Services, Inc.

Rig Count/Rig Count Current/MONTHLY SHALE GAS-TIGHT OIL RIG

Updated forecast suggests production minimum by late 3Q 2021

Base case is for U.S. production to fall to almost 9 mmb/d in 2021
It falls below 8 mmb/d in the low case

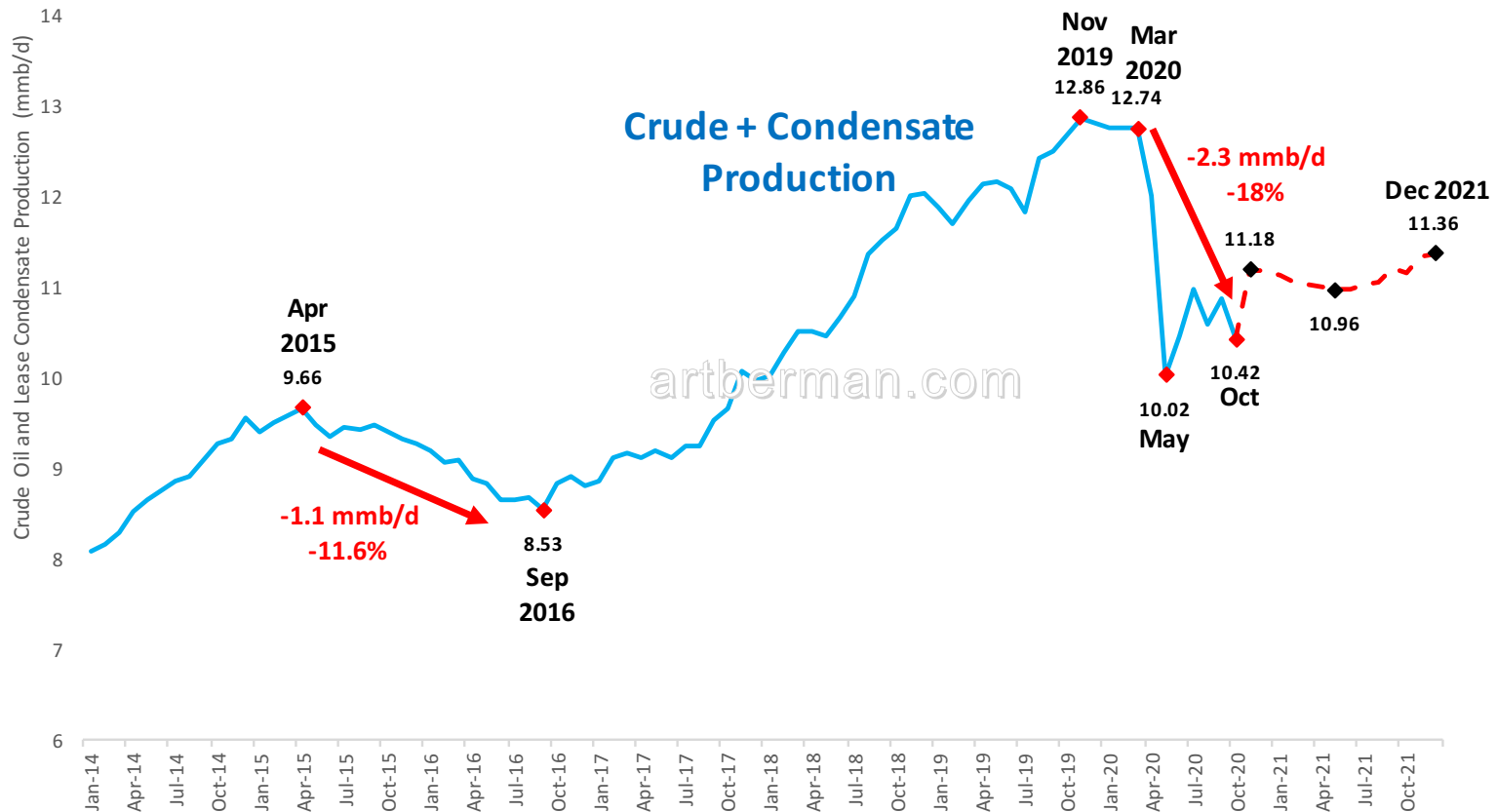


Source: Baker Hughes, EIA, Enverus & Labyrinth Consulting Services, Inc.

Rig Count/Rig Count Current/MONTHLY SHALE GAS-TIGHT OIL RIG

October production was -2.3 mmb/d less than March output of 12.74 mmb/d Latest EIA 914 data remains below STEO forecasts

U.S. oil production has fallen -2.3 mmb/d (-18%)
from 12.7 mmb/d in March 2020 to 10.4 mmb/d in October 2020
EIA expects production to average 11.1 mmb/d in 2021

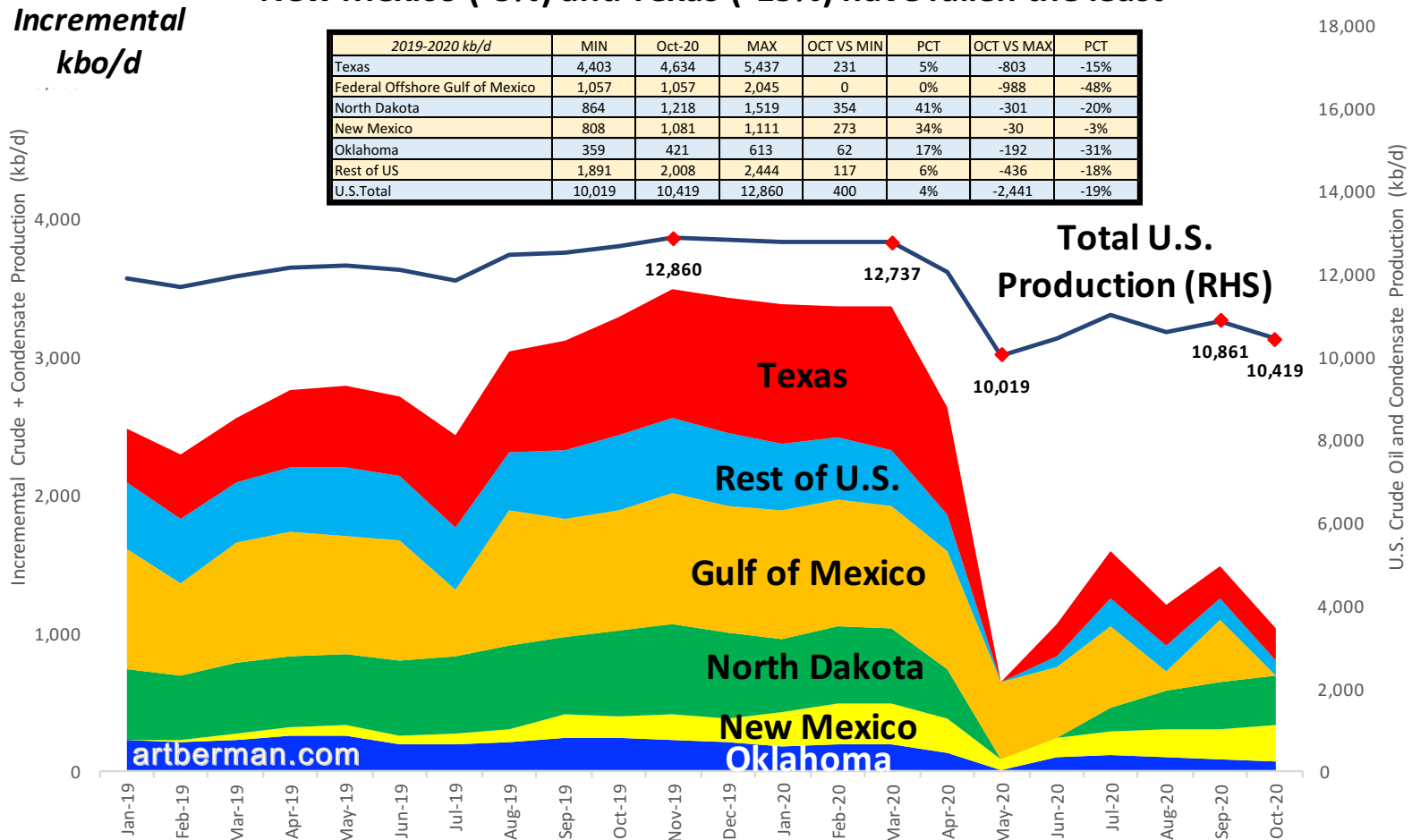


Source: EIA 914 & Labyrinth Consulting Services, Inc.

EIA Current/Monthly Updates/914 U.S. crude oil production 2010-2020

Gulf of Mexico (-1 mmb/d) & Texas (-0.8 mmb/d) have fallen most
Rest of U.S. has fallen -0.4 mmb/d, ND -0.3 mmb/d & OK -0.2 mmb/d

U.S. oil production is -2.44 mmb/d (-19%) less than 2019-2020 maximum 12.86 mmb/d
Offshore Gulf of Mexico (-48%) & Oklahoma (-31%) have fallen the most
New Mexico (-3%) and Texas (-15%) have fallen the least



Source: EIA 914 & Labyrinth Consulting Services, Inc.

EIA Current/Monthly Updates/914 U.S._crude_oil_production_2010-2020

Total U.S. decline rate is 43% annually
Well start to first oil is 140 days (~ 4.5 months)
First oil to legacy decline offset is another 215 days (~7 months)

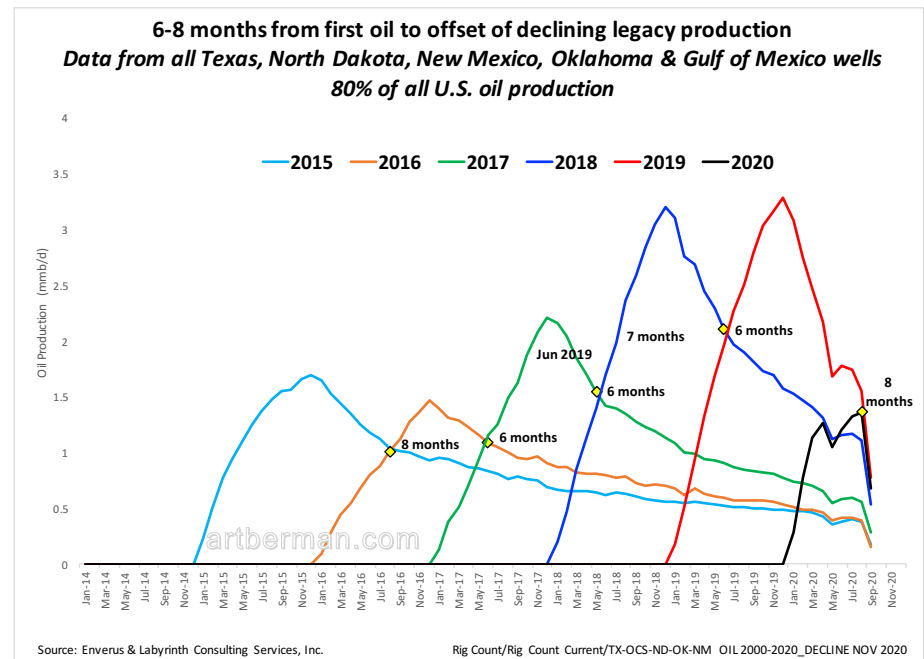
U.S. Crude and Condensate Production Base Decline				
<i>kb/d or pct</i>	PCT CURRENT PROD	ANNUAL DECLINE	CURRENT PROD	1 YEAR DECLINE
TX	44%	40%	4,687	1,875
OCS	11%	32%	1,196	383
ND	11%	50%	1,155	578
NM	10%	51%	1,015	518
OK	4%	52%	460	239
REST of US	20%	42%	2,066	872
TOTAL	100%	42%	10,579	4,464

Source: Enverus and Labyrinth Consulting Services, Inc.
Rig Count Current/TX-OCS-ND-OK-NM INTEGRATED STATIC DECLINE

Well Start to First Oil		
STATE	2019 Production barrels	DAYS
NM	125,442,505	142
OK	49,834,041	111
ND	134,716,668	151
FO GULF	47,089,112	127
TX	119,359,070	143
Wtd Avg Well Start to First Oil		140

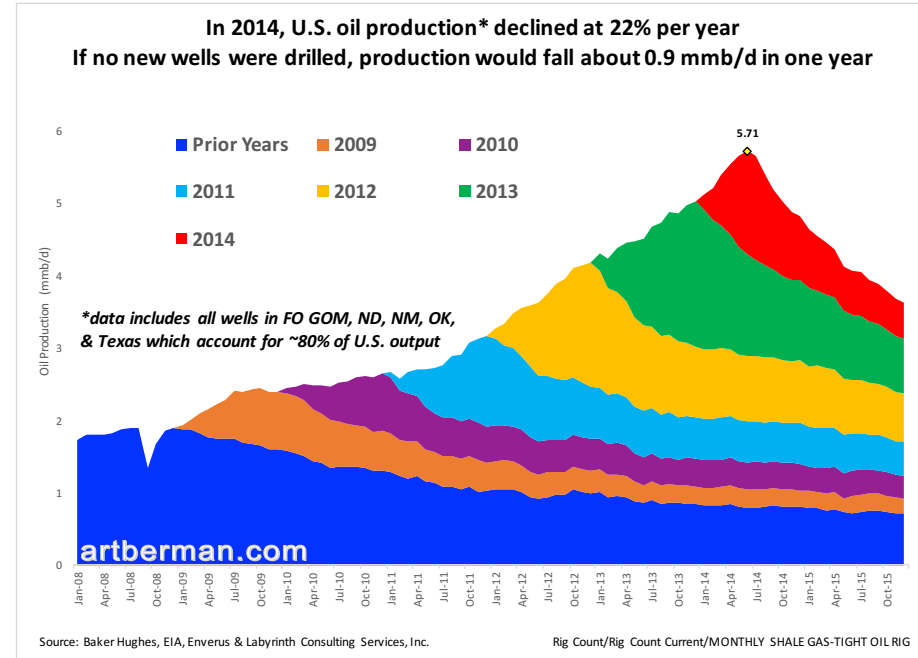
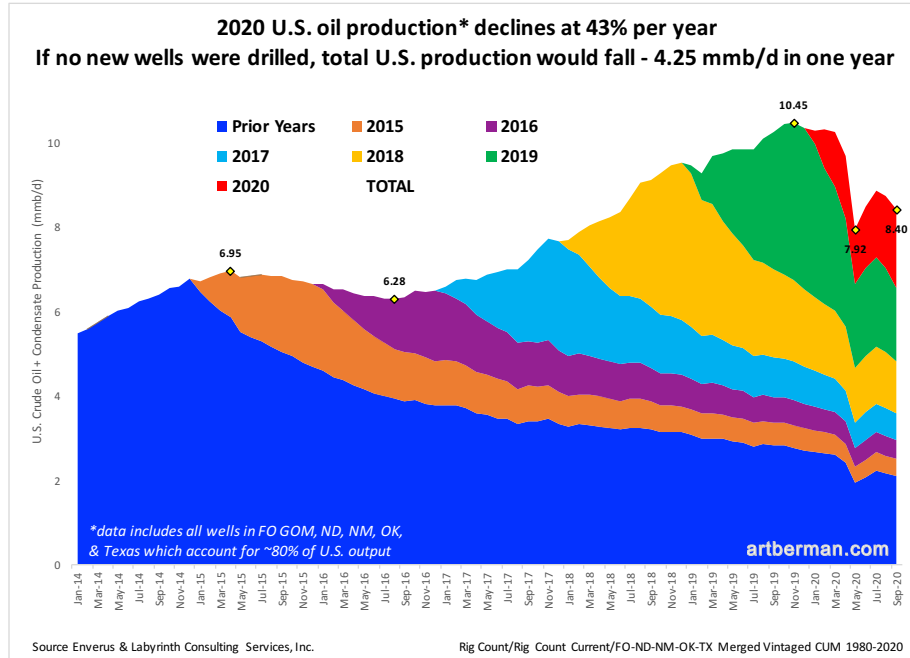
Well Start to Offset of Legacy Decline		
Wtd Avg Well Start to First Oil		140
1st Oil to Decline Offset		213
TOTAL		353

Source: Enverus and Labyrinth Consulting Services, Inc.
Rig Count Current/TX-OCS-ND-OK-NM OIL 2000-2020_DECLINE NOV 2020



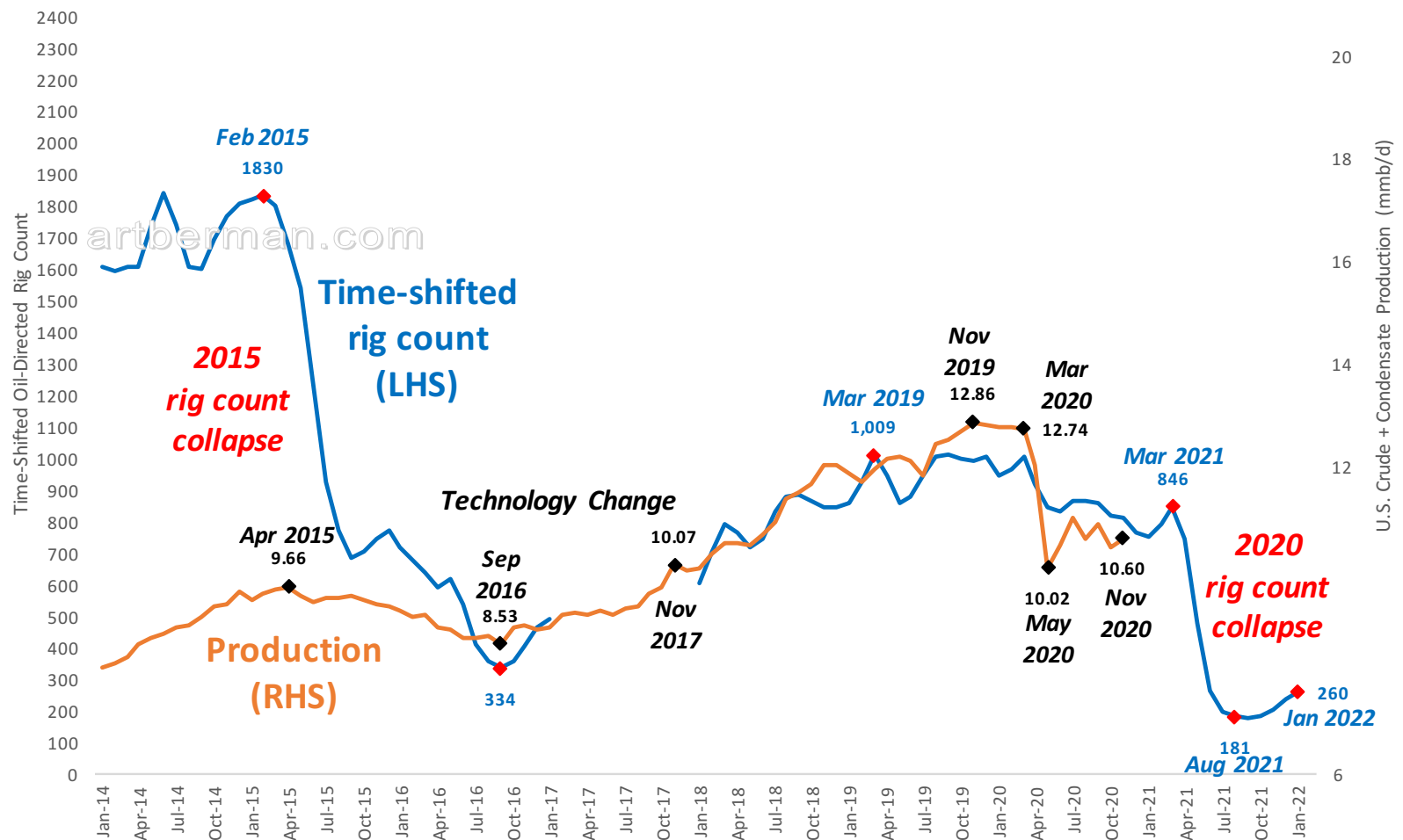
U.S. decline rate has increased from 22% in 2014 to 43% in 2019

Production would fall ~4.25 mmb/d today if no wells were drilled vs about 1 mmb/d in 2014



Rig count has been a reasonable guide to production since mid-2016 when properly time-shifted to account for start-drilling to decline offset

Annual decline rate has increased from 22% to 43% and -1.0 to -4.3 mmb/d between 2015 and 2020 production and rig count collapses

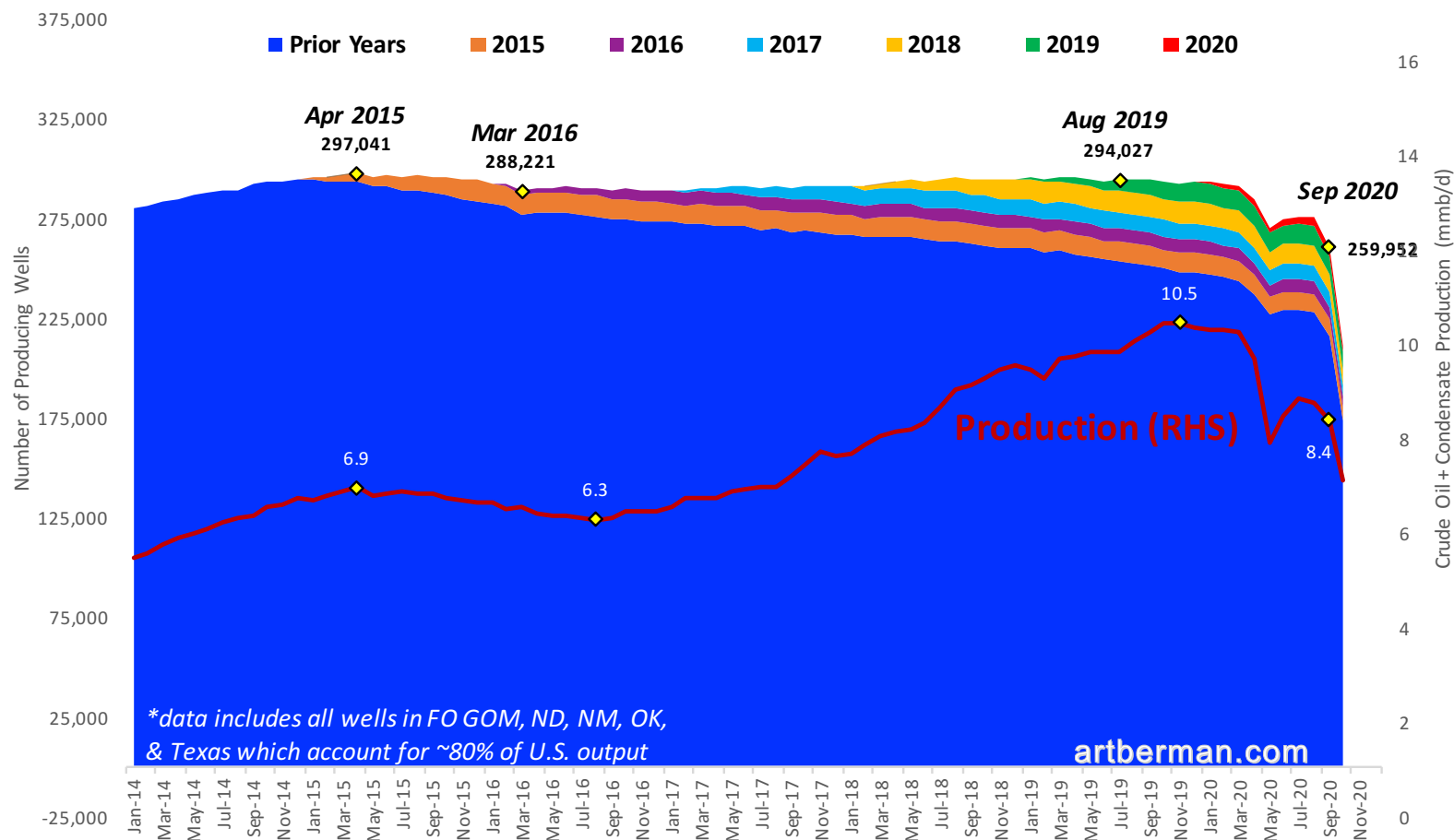


Source: Baker Hughes, EIA, Enverus & Labyrinth Consulting Services, Inc.

Rig Count/Rig Count Current/MONTHLY SHALE GAS-TIGHT OIL RIG

Number of active wells has fallen more in 2020 than at any other time

Number of active U.S. wells has fallen by more than 34,000 (-12%) since August 2019
Active wells only fell by 8,800 (-3%) from April 2015 to March 2016
during the last price collapse



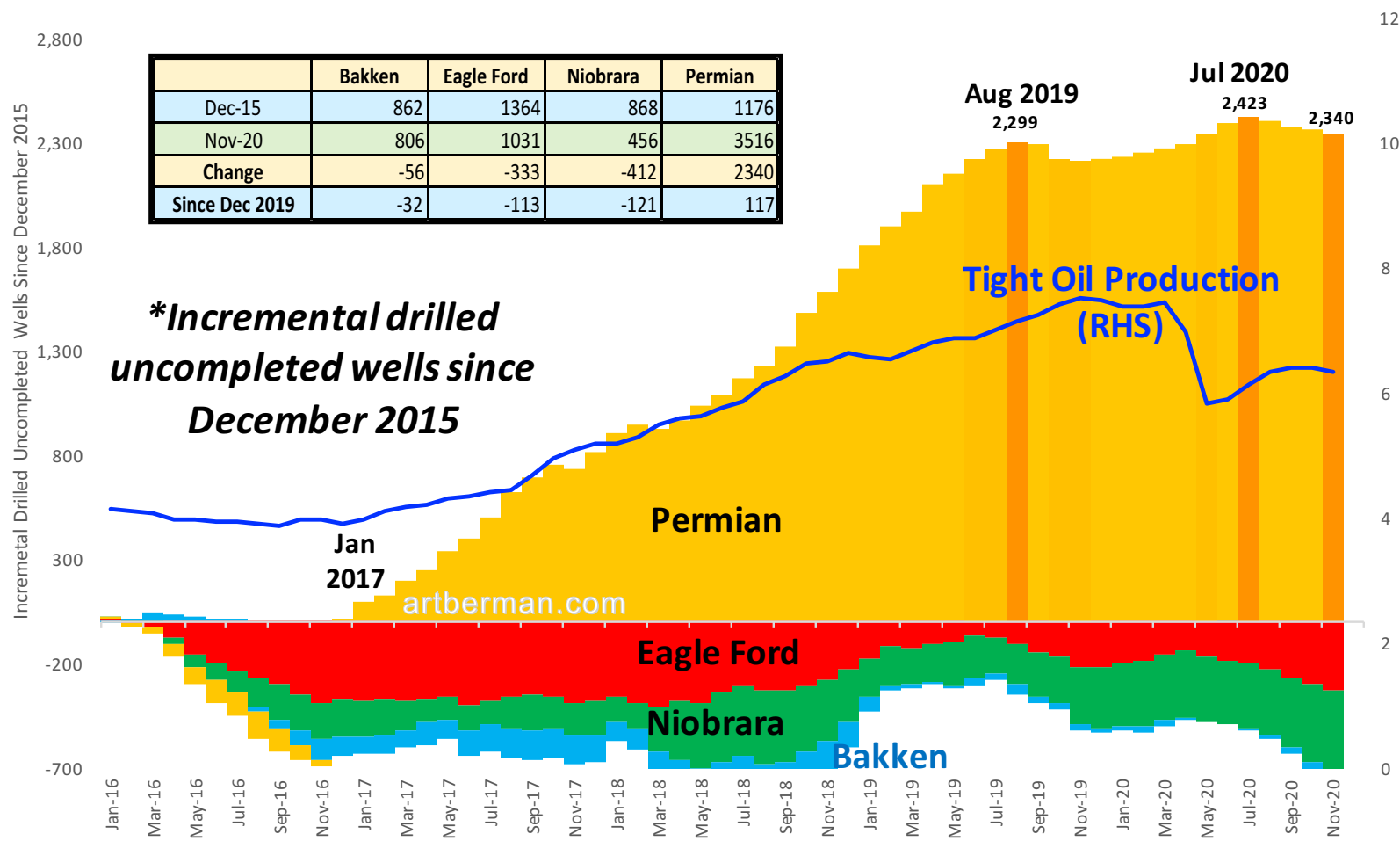
Source Enverus & Labyrinth Consulting Services, Inc.

Rig Count/Rig Count Current/FO-ND-NM-OK-TX Merged Vintaged CUM 1980-2020

Drilled uncompleted wells are not a greater factor now than during past 5 years

Their distribution has shifted more to the Permian basin than before

Little evidence that declining DUCs are affecting 2020 tight oil production

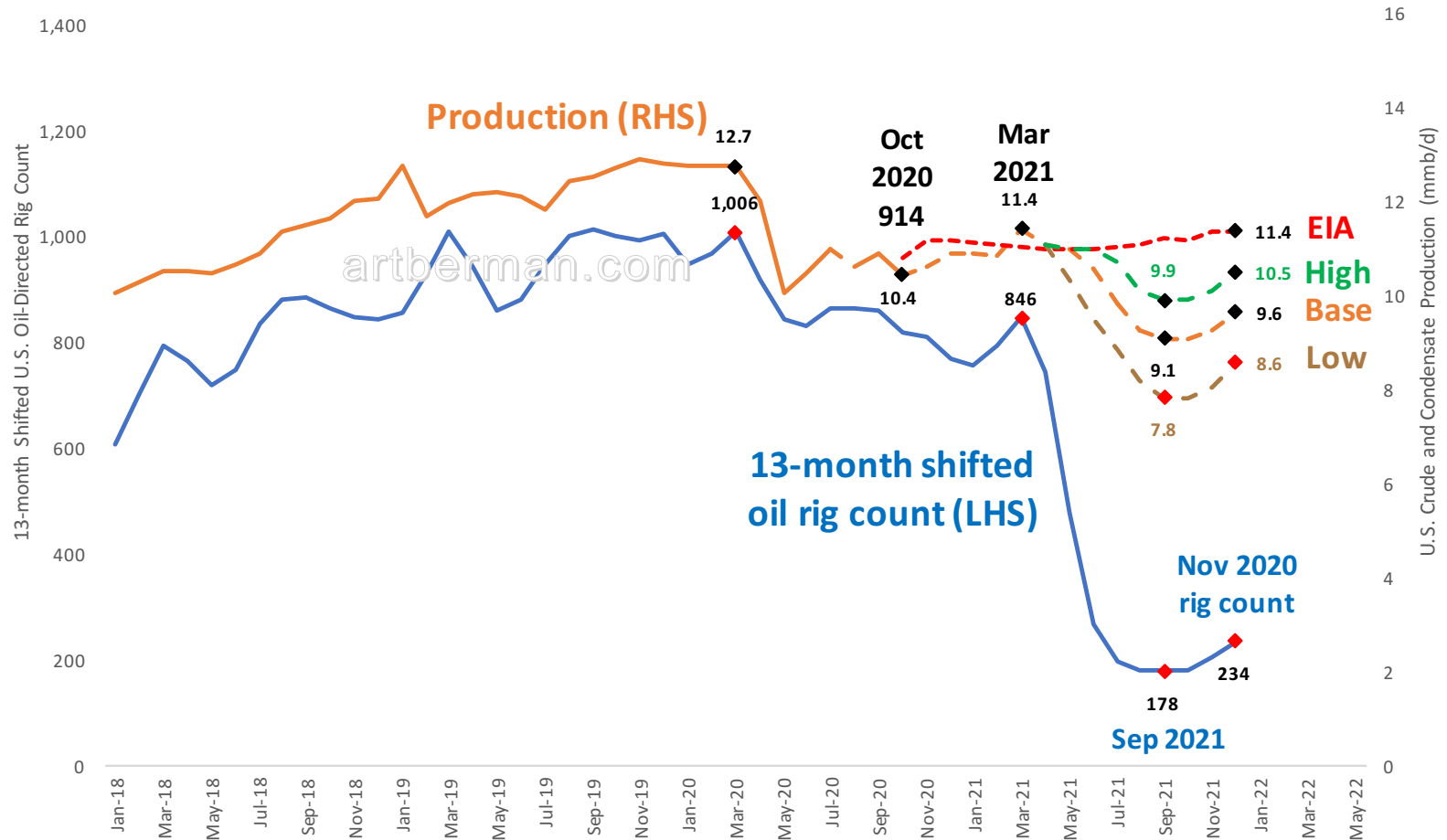


Source: EIA & Labyrinth Consulting Services, Inc

EIA Current/ DUC-DPR/ duc-data_MASTER

With all that it mind...
The forecast is probably optimistic

Base case is for U.S. production to fall to almost 9 mmb/d in 2021
It falls below 8 mmb/d in the low case



Source: Baker Hughes, EIA, Enverus & Labyrinth Consulting Services, Inc.

Rig Count/Rig Count Current/MONTHLY SHALE GAS-TIGHT OIL RIG