Art Berman

Coronavirus Has Crushed Oil Prices

E+ Institute
March 27, 2020

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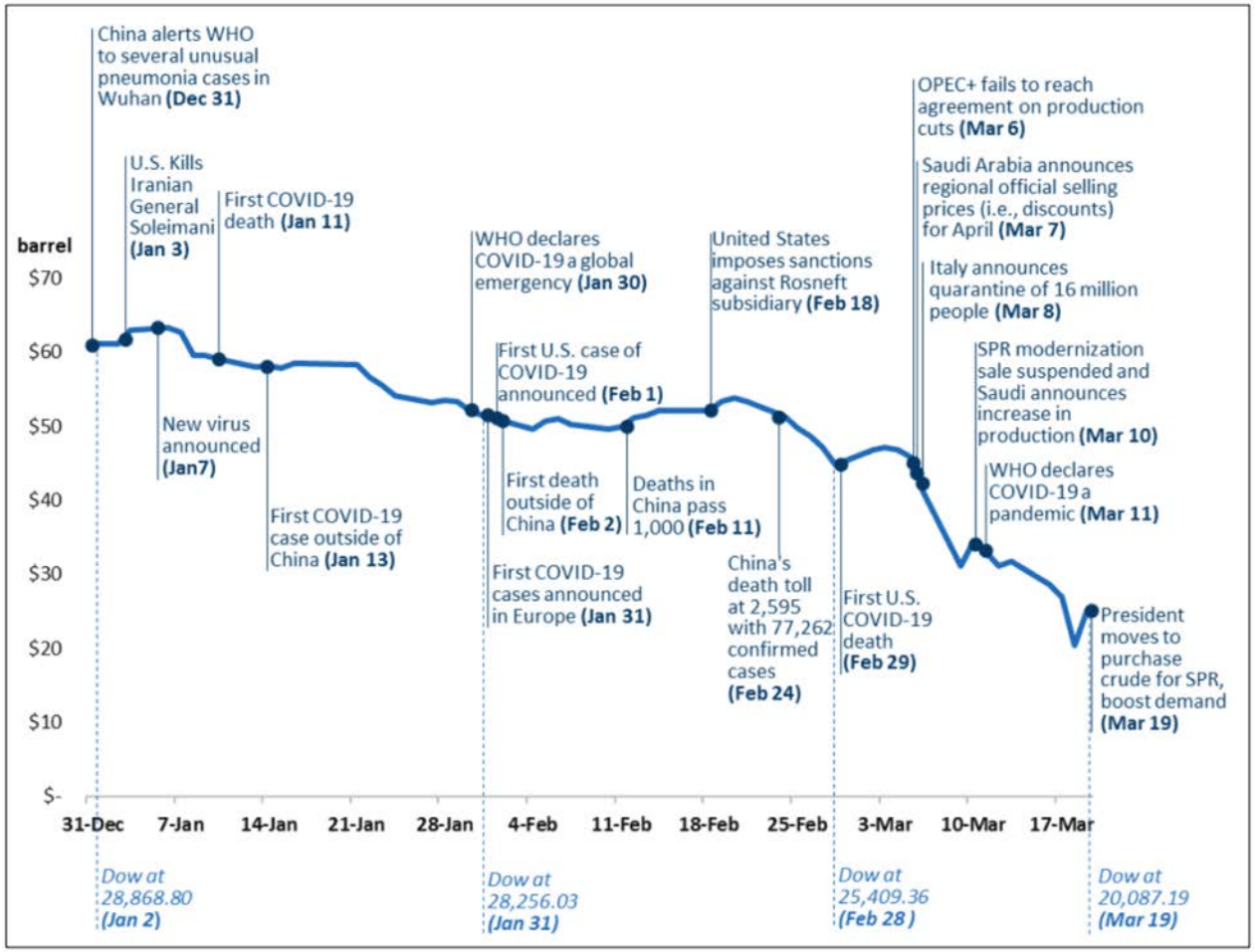
Summary Observations

- Energy is the economy & oil dominates energy. The economy does not run on money; it runs on energy
- Renewable energy will be an increasing part of our energy future but it is not expected to account for more than 15% of total U.S. consumption by 2050.
- The end of cheap oil has driven the world economy toward debt.
- Oil prices have been low since 2014 because of a familiar cycle of over-investment, over-supply and devaluation.
- Current oil-price collapse is because of self-imposed, unavoidable global economic depression.
- There is no price war.
- Oil prices will probably not fall much lower on a sustained basis.
- Fluctuating sentiment about the direction of the global economy will move markets up and down in 2020.
- Markets will recover but probably never to 2018 levels.

Figure 1. West Texas Intermediate (WTI) Spot Price and Selected Events

December 31, 2019–March 19, 2020

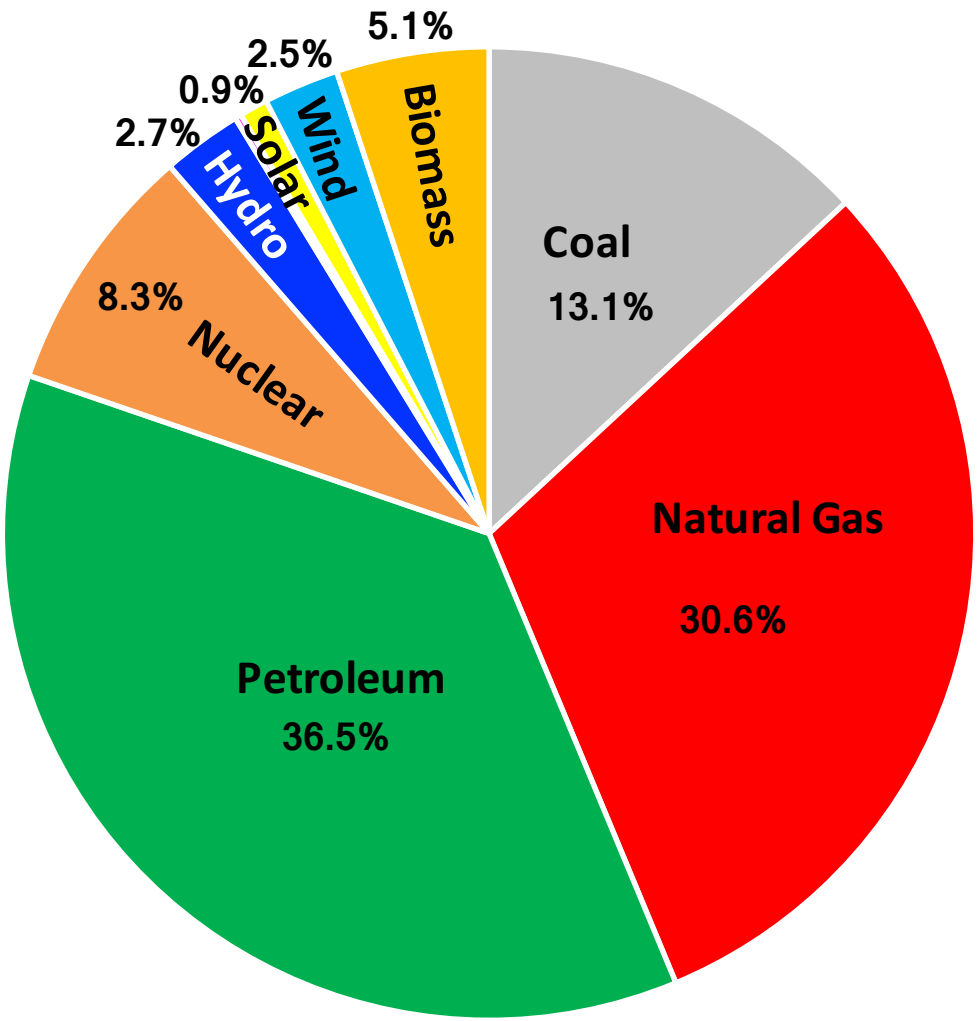


Source: Compiled by CRS. WTI daily spot prices from Bloomberg. Coronavirus timeline and other announcements from media reporting.

“Energy is and always will be the currency of life”
–Nate Hagens

- Any movement, activity or event in nature requires energy.
- Human society runs on energy:
  - Work requires energy—joules/calories.
  - Subsistence: energy intake = energy expenditure.
  - Surplus: energy intake > energy expenditure.
  - If I accumulate excess energy such as grain, I may choose to have you do some of my work in exchange for some of that energy.
- Money is a claim on work.
- Debt is a claim on future energy surplus--only productive if oil is cheap (energy intake>energy expenditure)
- Today, most work is done by oil, natural gas and coal.
- 1 barrel of oil contains about 4.5 years of human manual labor.

Energy is the Economy
For now, that means oil, natural gas and coal

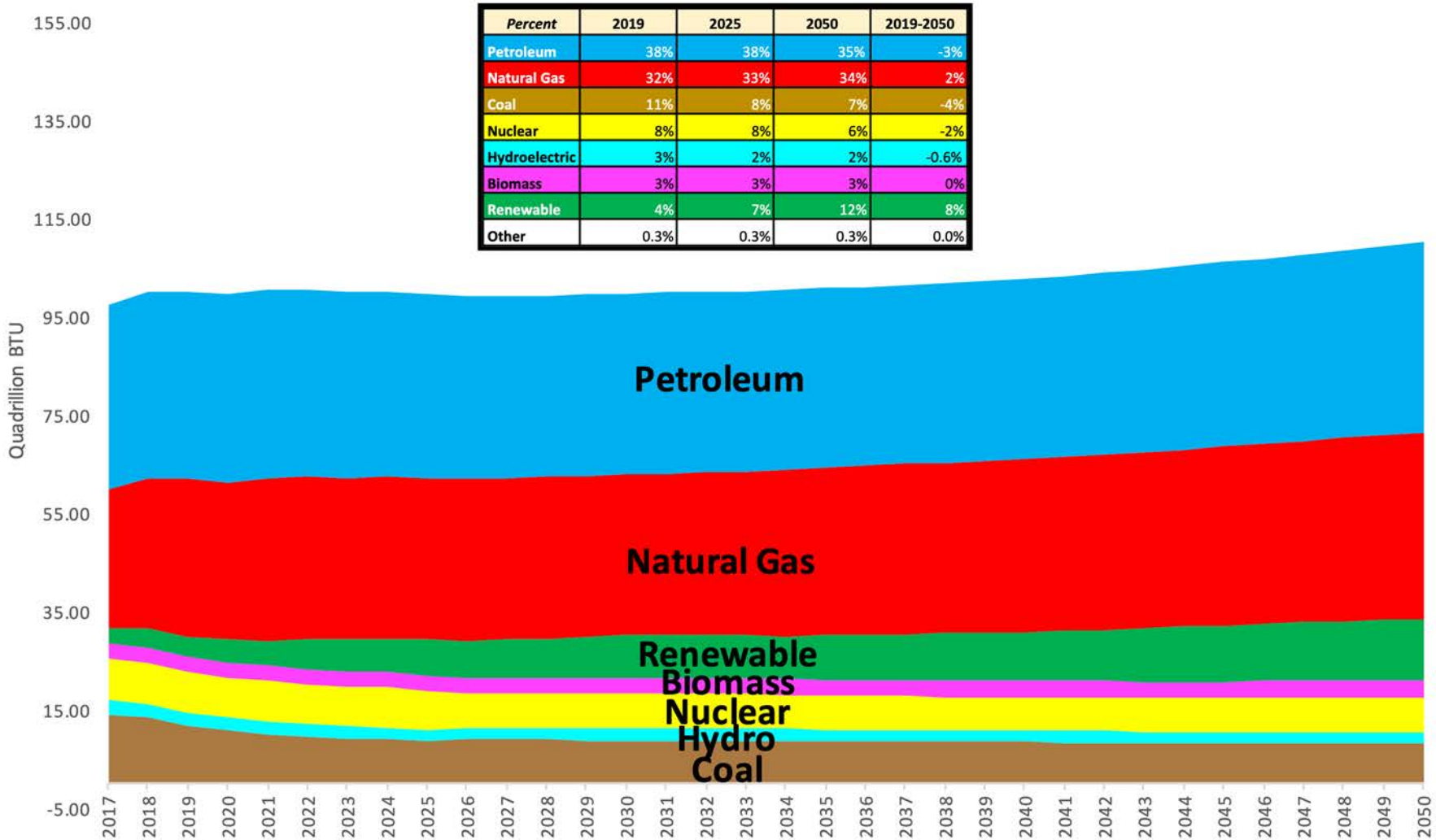


Source: EIA & Labyrinth Consulting Services, Inc.

Table_1.3_Primary_Energy_Consumption_by_Source

Renewable energy sources expected to account for 12% of U.S. energy in 2050
Petroleum will account for 35%, natural gas 34% and coal 7% in 2050
AEO 2020

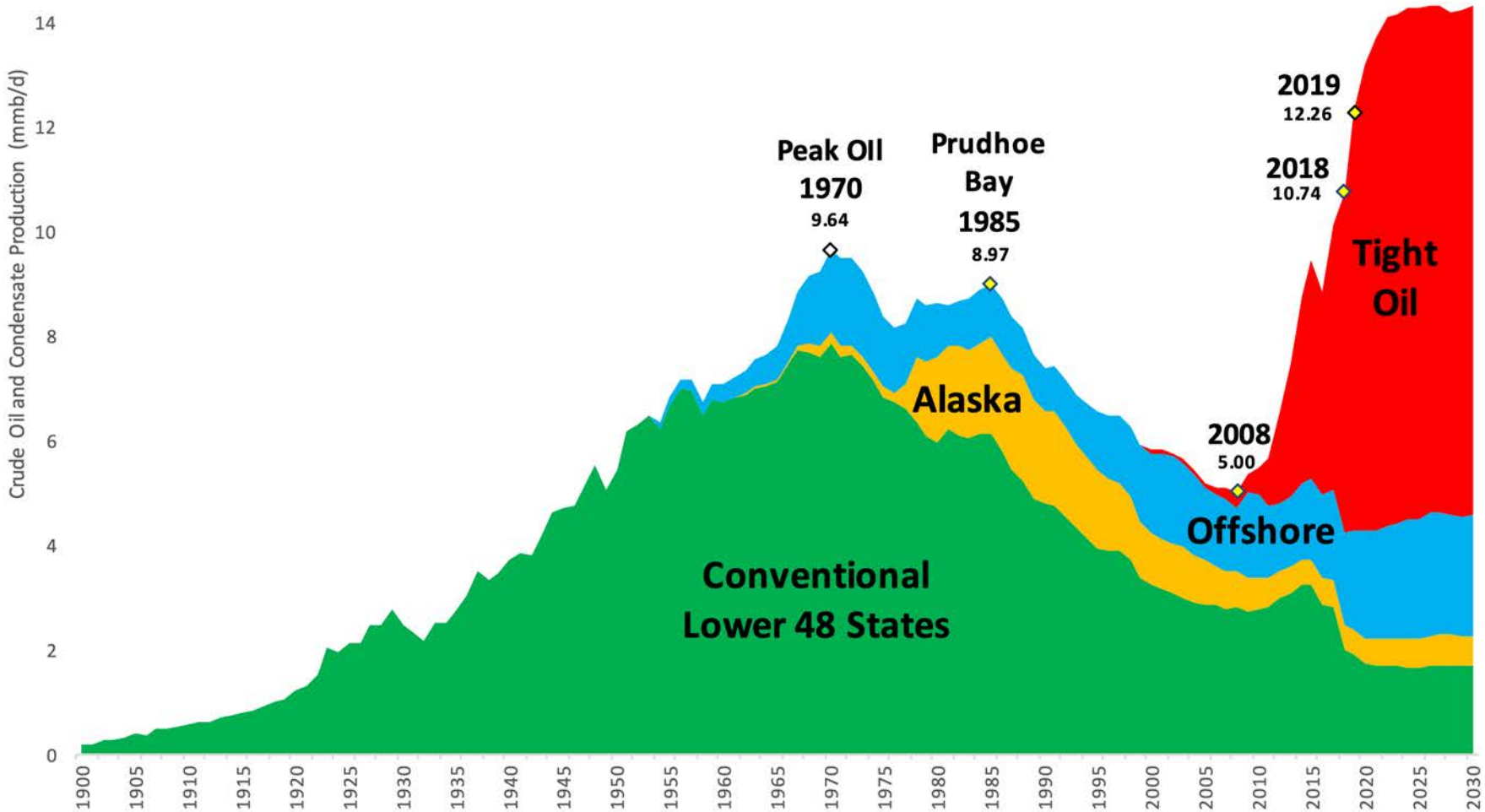
Percent	2019	2025	2050	2019-2050
Petroleum	38%	38%	35%	-3%
Natural Gas	32%	33%	34%	2%
Coal	11%	8%	7%	-4%
Nuclear	8%	8%	6%	-2%
Hydroelectric	3%	2%	2%	-0.6%
Biomass	3%	3%	3%	0%
Renewable	4%	7%	12%	8%
Other	0.3%	0.3%	0.3%	0.0%



Source: EIA & Labyrinth Consulting Services, Inc.

AEO 2020 Primary Energy Consumption Forecast_aeotab_1-1.xlsx

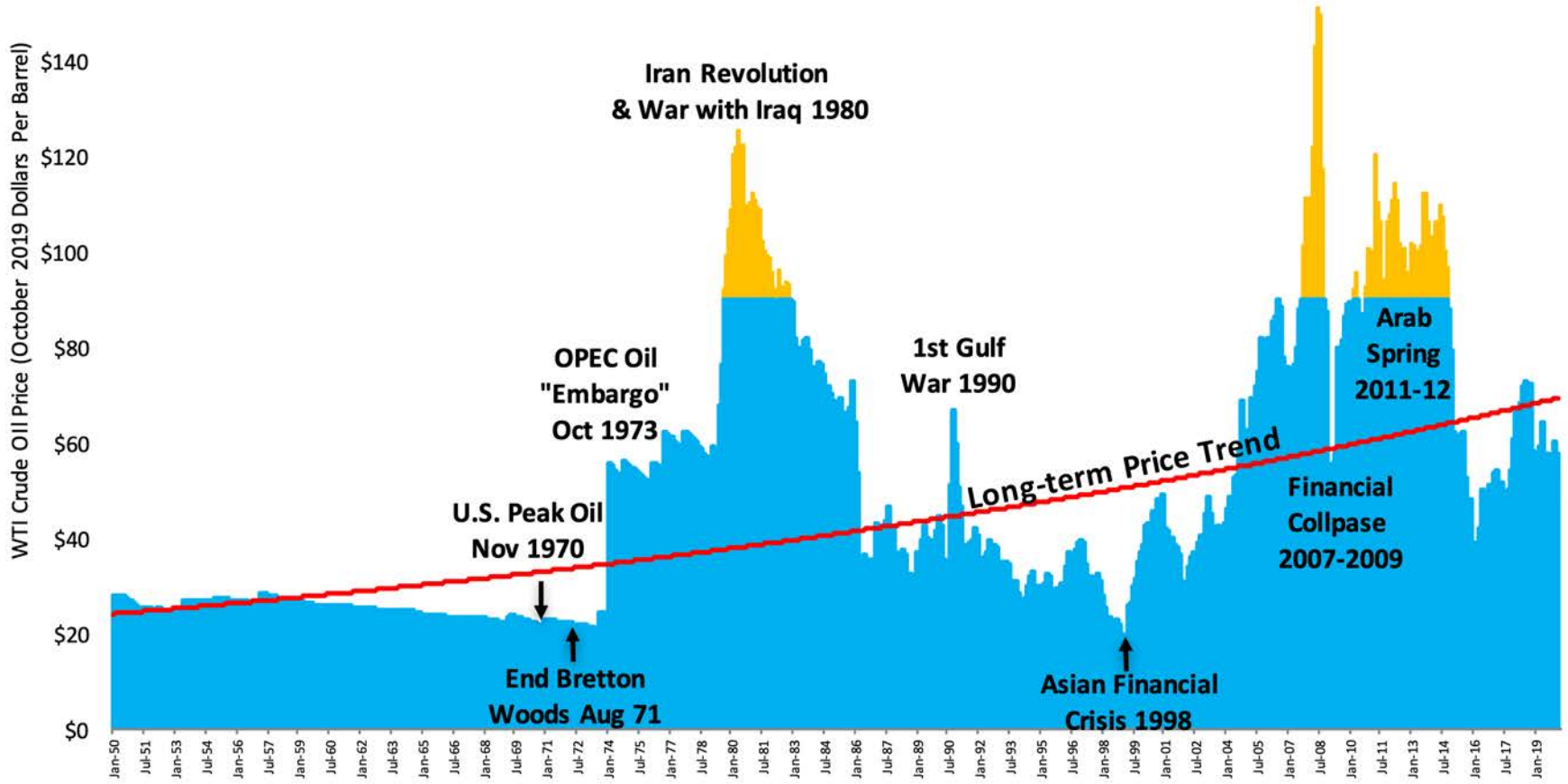
U.S. oil production initially peaked in 1970 & declined by almost 50% by 2008
Production surpassed its previous peak in 2018 because of tight oil



Source: EIA, & Labyrinth Consulting Services, Inc.

EIA Current/Monthly Updates/CRUDE OIL PRODUCTION ANNUAL_UPDATED AEO 2020

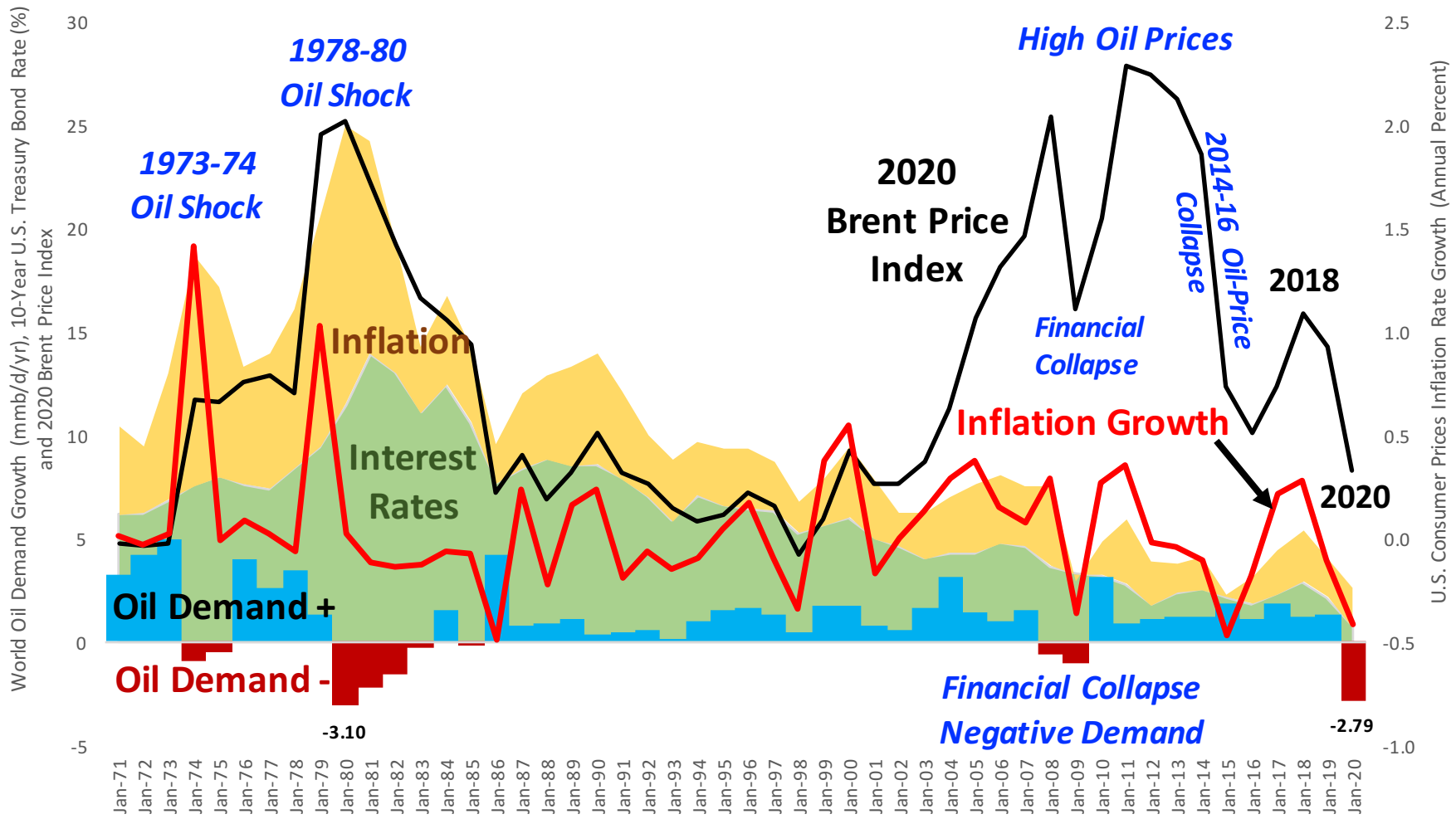
The End of Cheap Oil
Low, stable oil prices ended in 1973
Higher oil prices have been a key factor in the global economy ever since
All values in October 2019 dollars



Source: EIA , Federal Reserve Bank & Labyrinth Consulting Services, Inc.

Oil & Gas General/CPI-Adj WTI Oil Price GT $90_MASTER

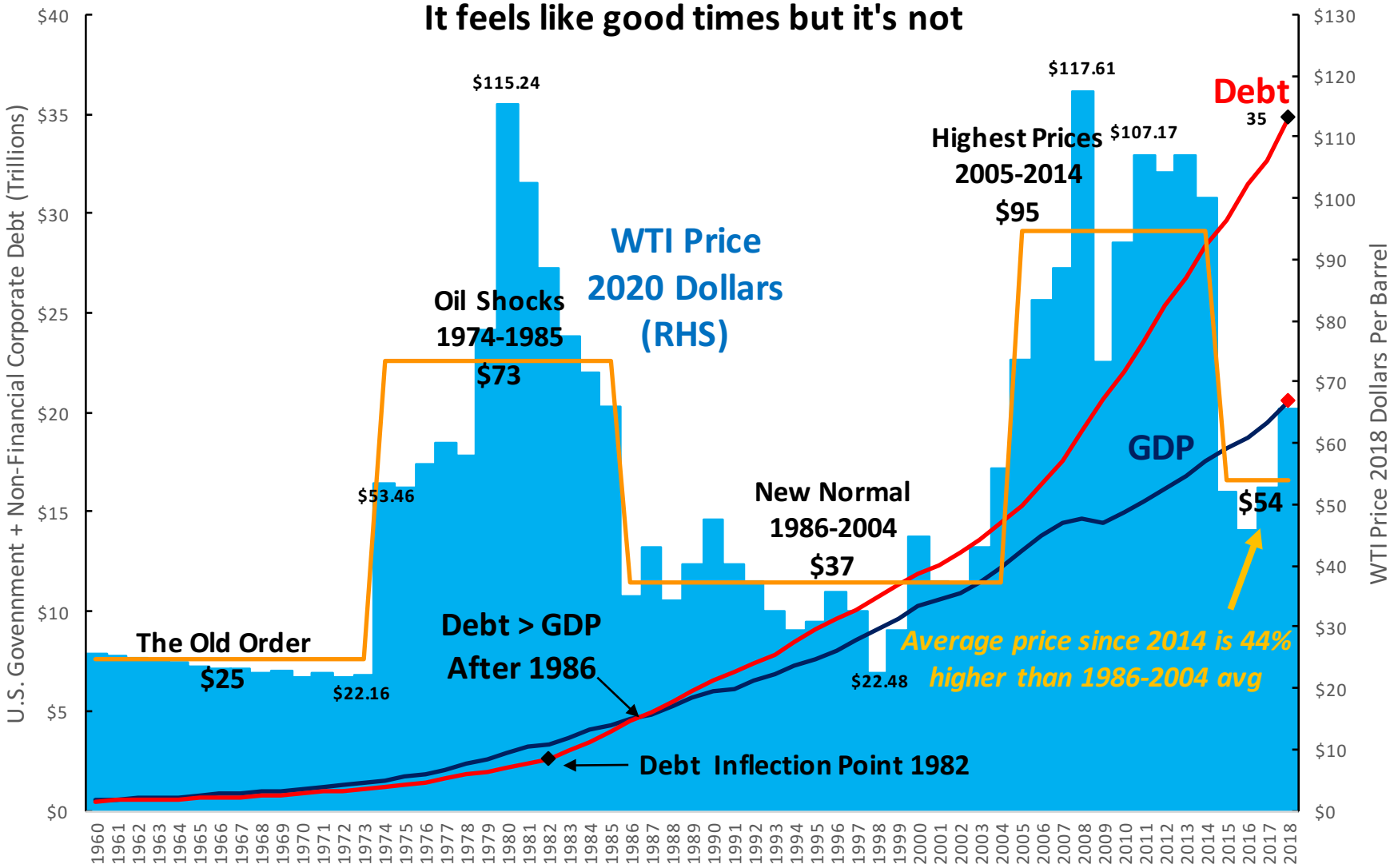
2020 oil demand expected to be more negative than in 2009
Decrease in interest and inflation rates likely to be greater



Source: EIA, US Federal Reserve Bank, & Labyrinth Consulting Services, Inc.

Oil & Gas C

U.S. Debt began increasing during oil shocks & exceeded GDP By 1986
U.S. and the world have been borrowing forward on their surplus energy
It feels like good times but it's not



Source: U.S. Federal Reserve Bank, U.S. Bureau of Labor Statiistics, World Bank, EIA & Labyrinth Consulting Services, Inc.

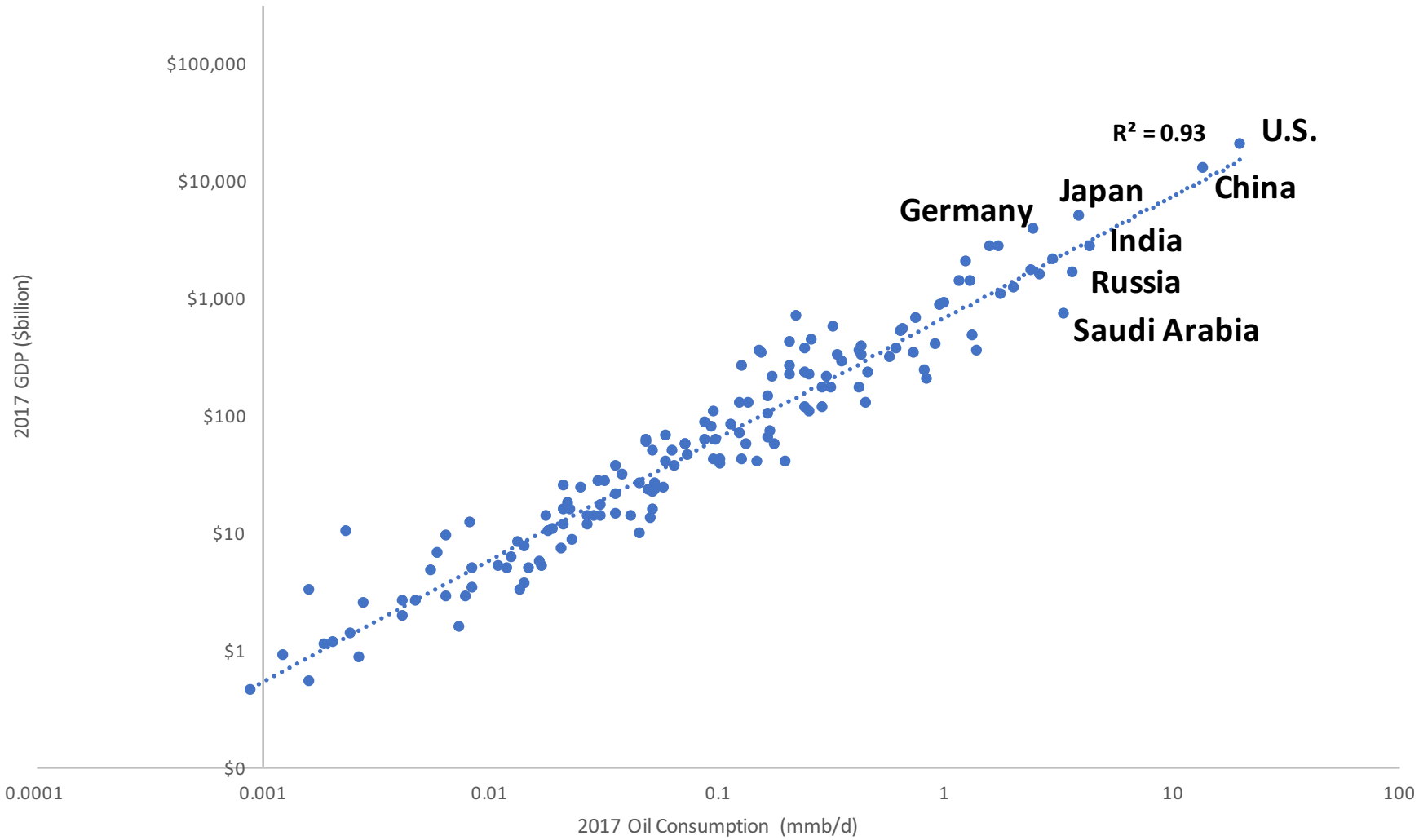
Oil & Gas General/U.S. Public Debt

Thoughts on Oil & Energy Transition to Renewable Sources

- Energy is the economy and oil is the master energy resource.
- Oil will continue to dominate the world energy landscape for decades because no other energy source can meet global needs.
- Unconventional oil has bought the world a few decades of high density energy but does not offer a meaningful long-range alternative.
- Humans have never gone from higher- to a lower-density energy source.
- While increased use of renewable energy is inevitable and desirable, it is not a satisfactory substitute for oil.
- A transition away from an oil-weighted energy supply will be complex, costly and lengthy despite supporting arguments or preferences.
- There is no clear way forward that includes sustaining current levels of energy use.
- The best path forward is to stop looking for improbable solutions that allow us to live like energy is still cheap, and find ways to live better with less.

GDP is proportional to oil consumption

Logarthmic Scales

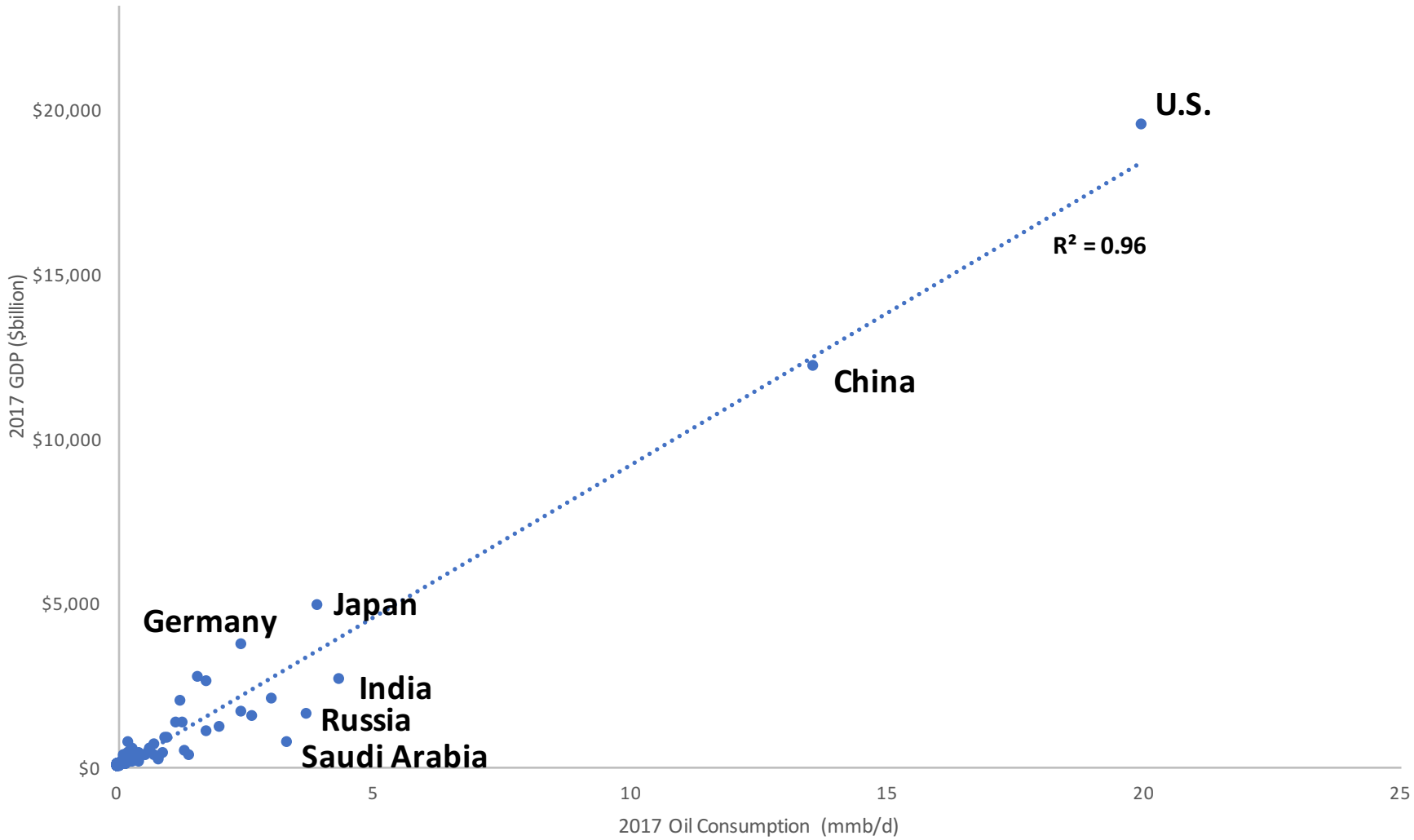


Source: EIA, World Bank & Labyrinth Consulting Services, Inc.

Oil & Gas General/GDP VS OIL CONSUMPTION 2017

GDP is proportional to oil consumption

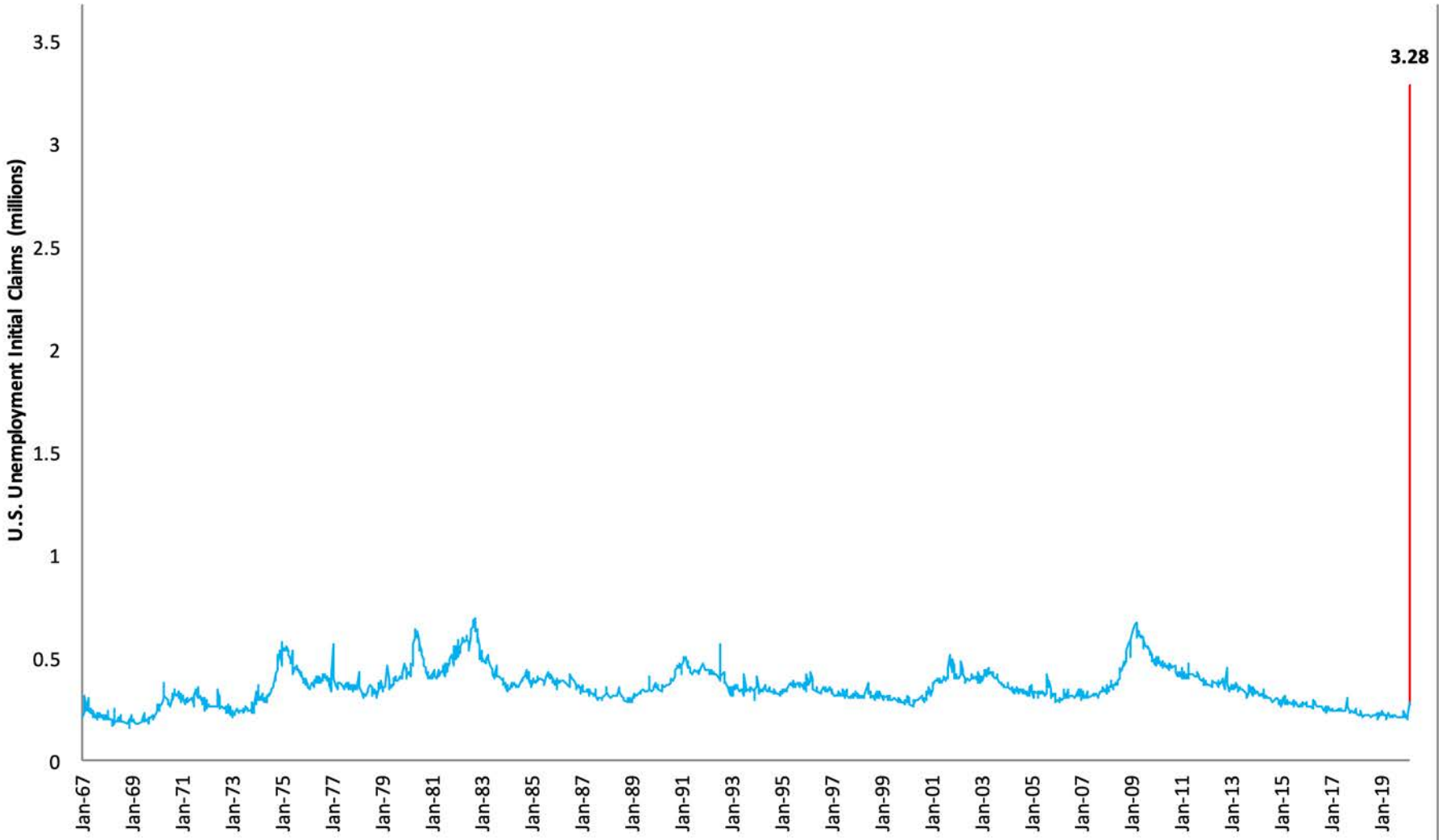
Linear Scales



Source: EIA, World Bank & Labyrinth Consulting Services, Inc.

Oil & Gas General/GDP VS OIL CONSUMPTION 2017

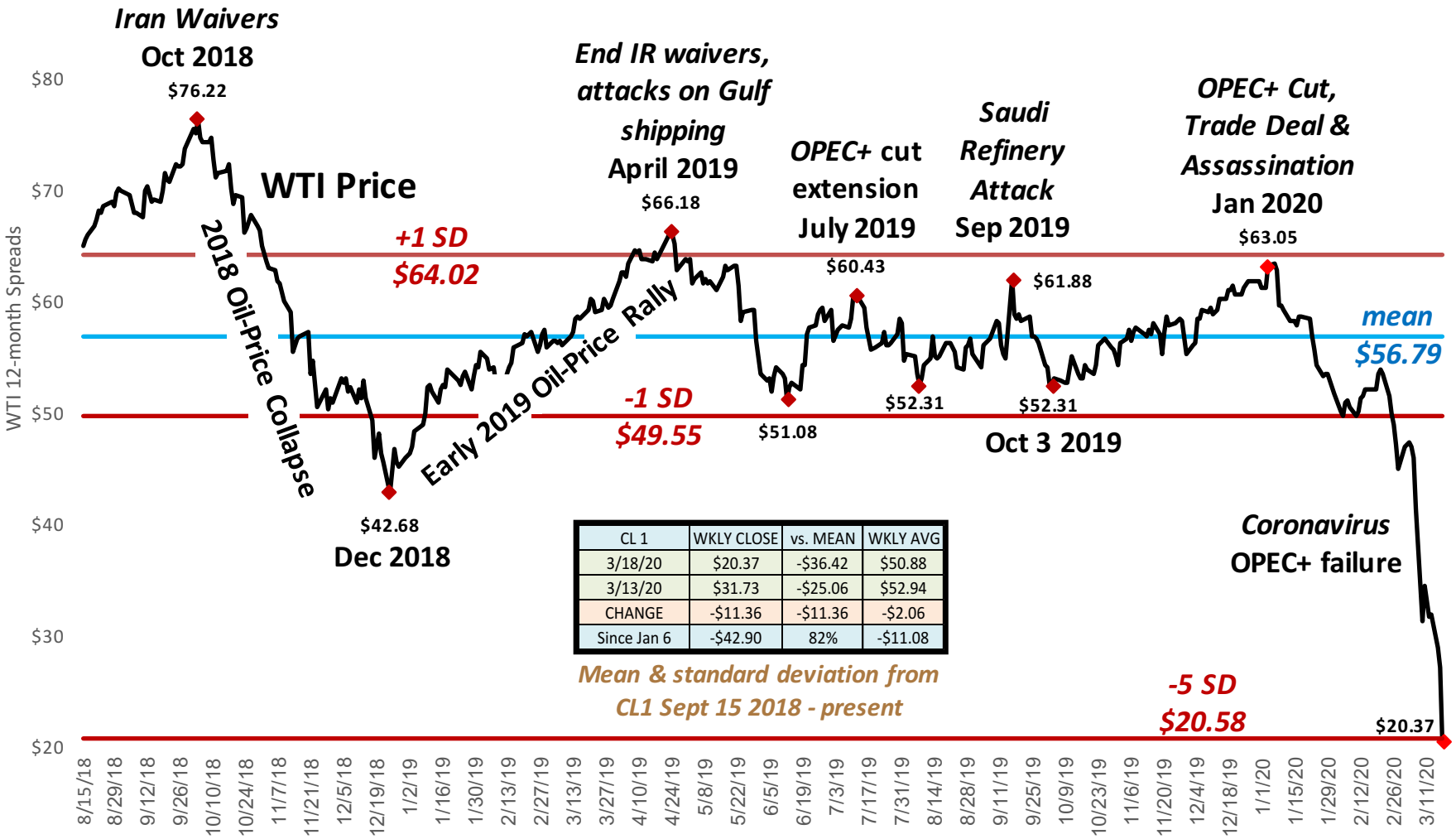
U.S. unemployment claims reached record levels week ending March 20



Source: Yahoo Finance, EIA & Labyrinth Consulting Services, Inc.

Oil & Gas General/Unemployment Initial Claims

Five oil rallies failed from mid-2018 to early 2020
Prices were largely range bound within 1 standard deviation of the mean until coronavirus & OPEC+ failure combined to collapse prices to -5 standard deviations



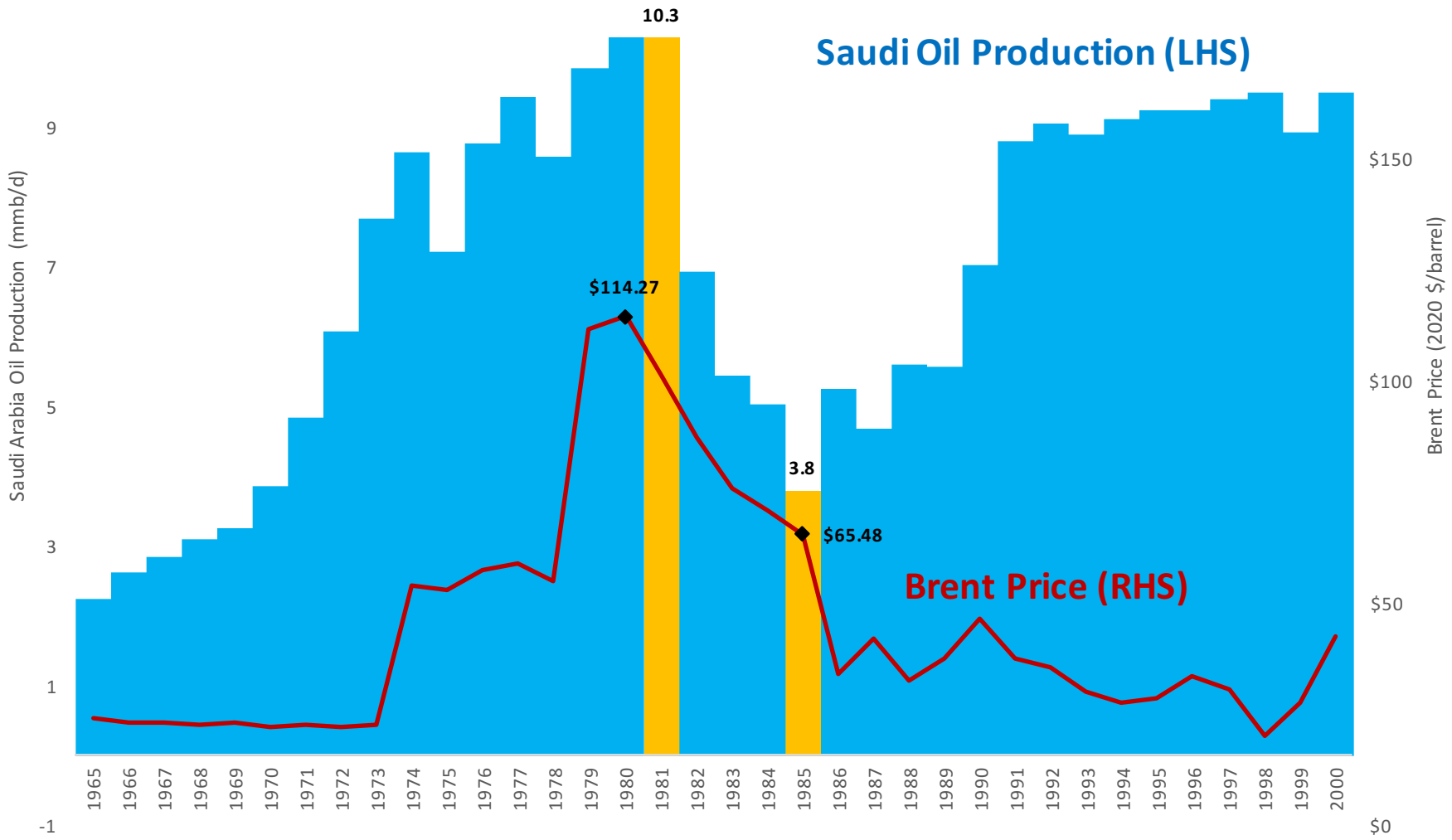
CL 1	WKLY CLOSE	vs. MEAN	WKLY AVG
3/18/20	$20.37	-$36.42	$50.88
3/13/20	$31.73	-$25.06	$52.94
CHANGE	-$11.36	-$11.36	-$2.06
Since Jan 6	-$42.90	82%	-$11.08

Mean & standard deviation from CL1 Sept 15 2018 - present

Source: Quandl & Labyrinth Consulting Services, Inc.

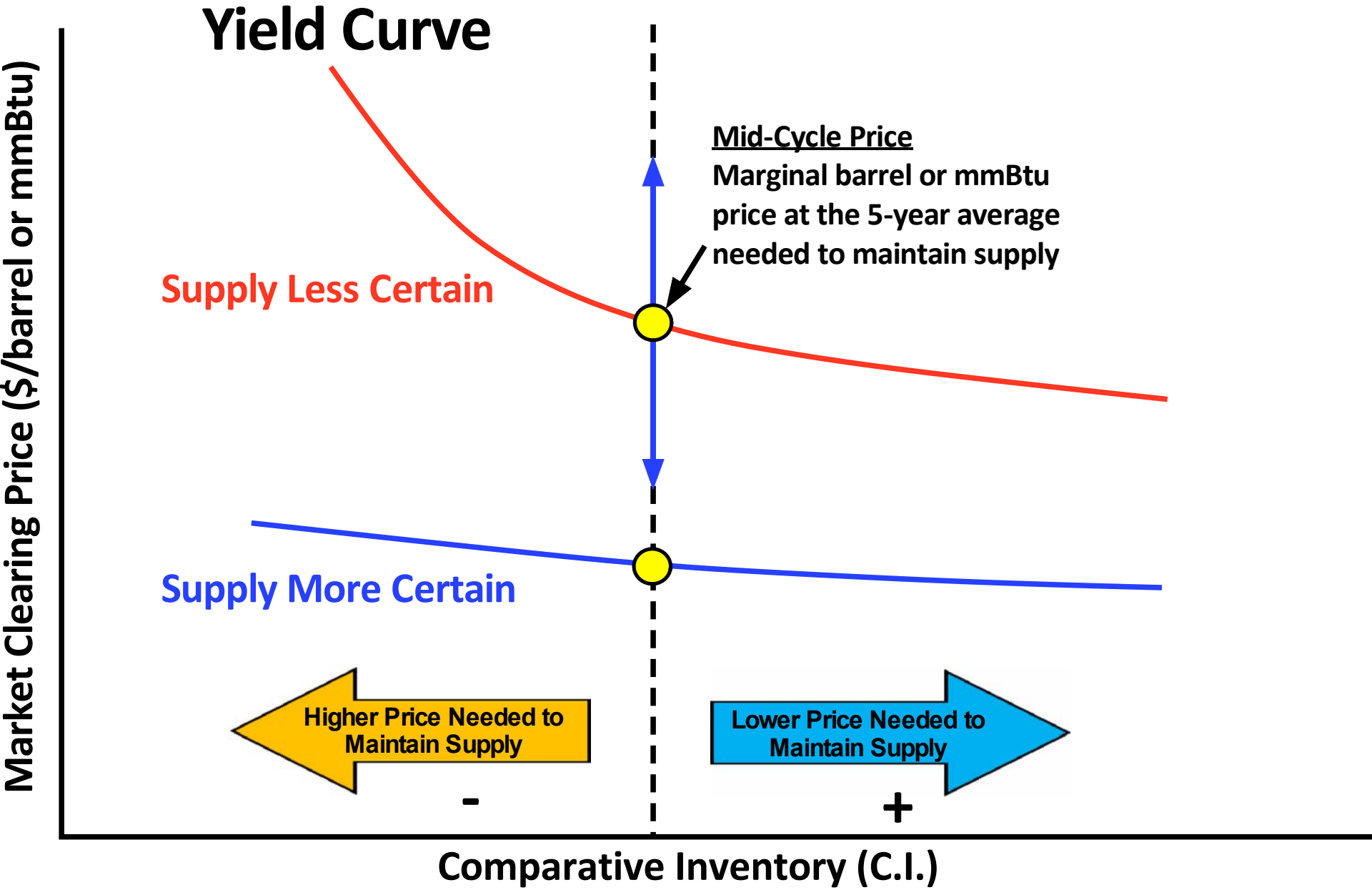
Oil & Gas General/Futures & Future Spreads/CL1&CL7 Futures

Saudi oil production fell 6.5 mmb/d from 1981 to 1985 but Brent price fell from $114 to $65 in 2020 dollars



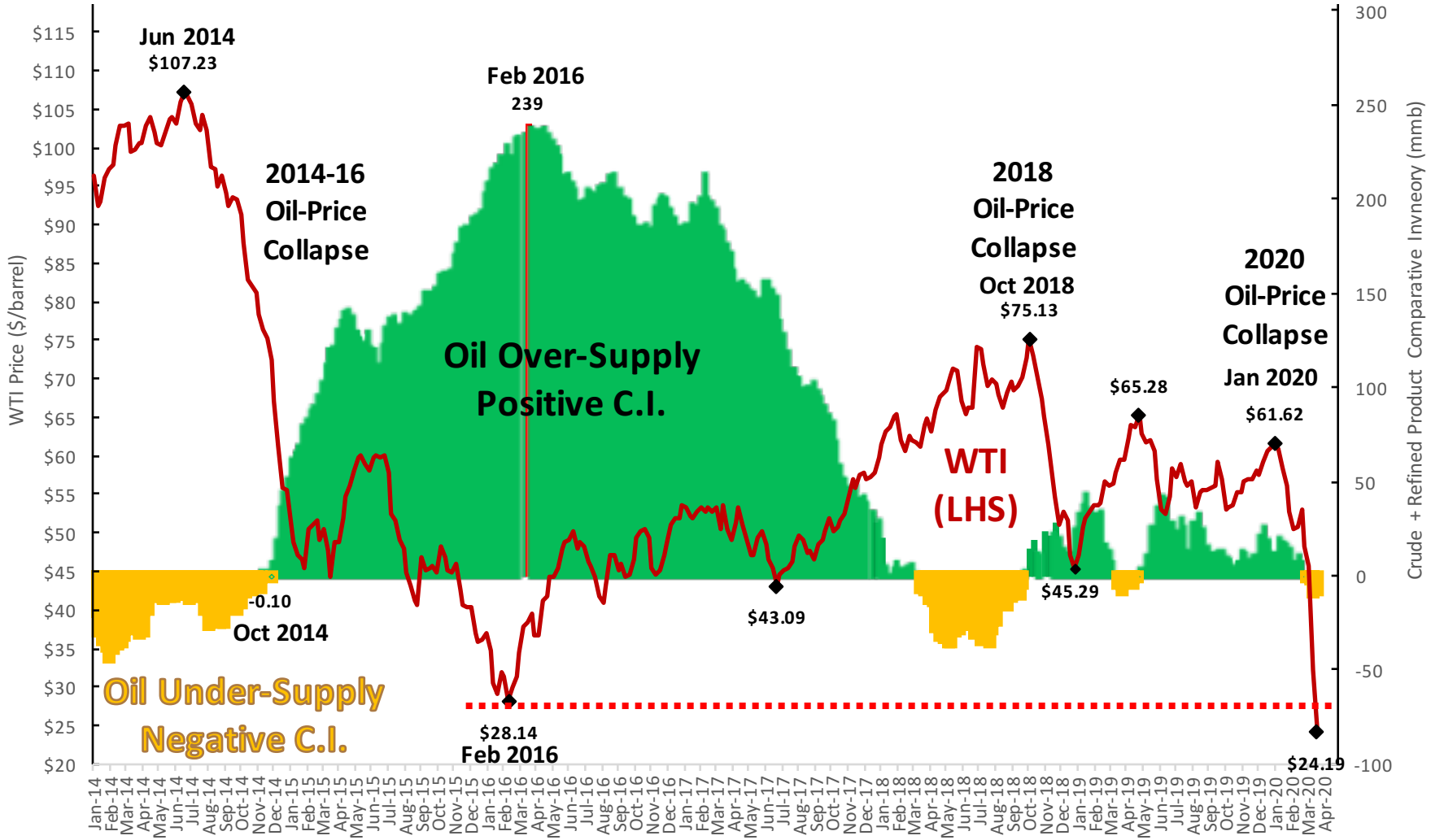
Source: EIA, BP & Labyrinth Consulting Services, Inc.

EIA/EIA International/International_data_ANNUAL MASTER



Source: Aperio Energy Research & Labyrinth Consulting Services, Inc.

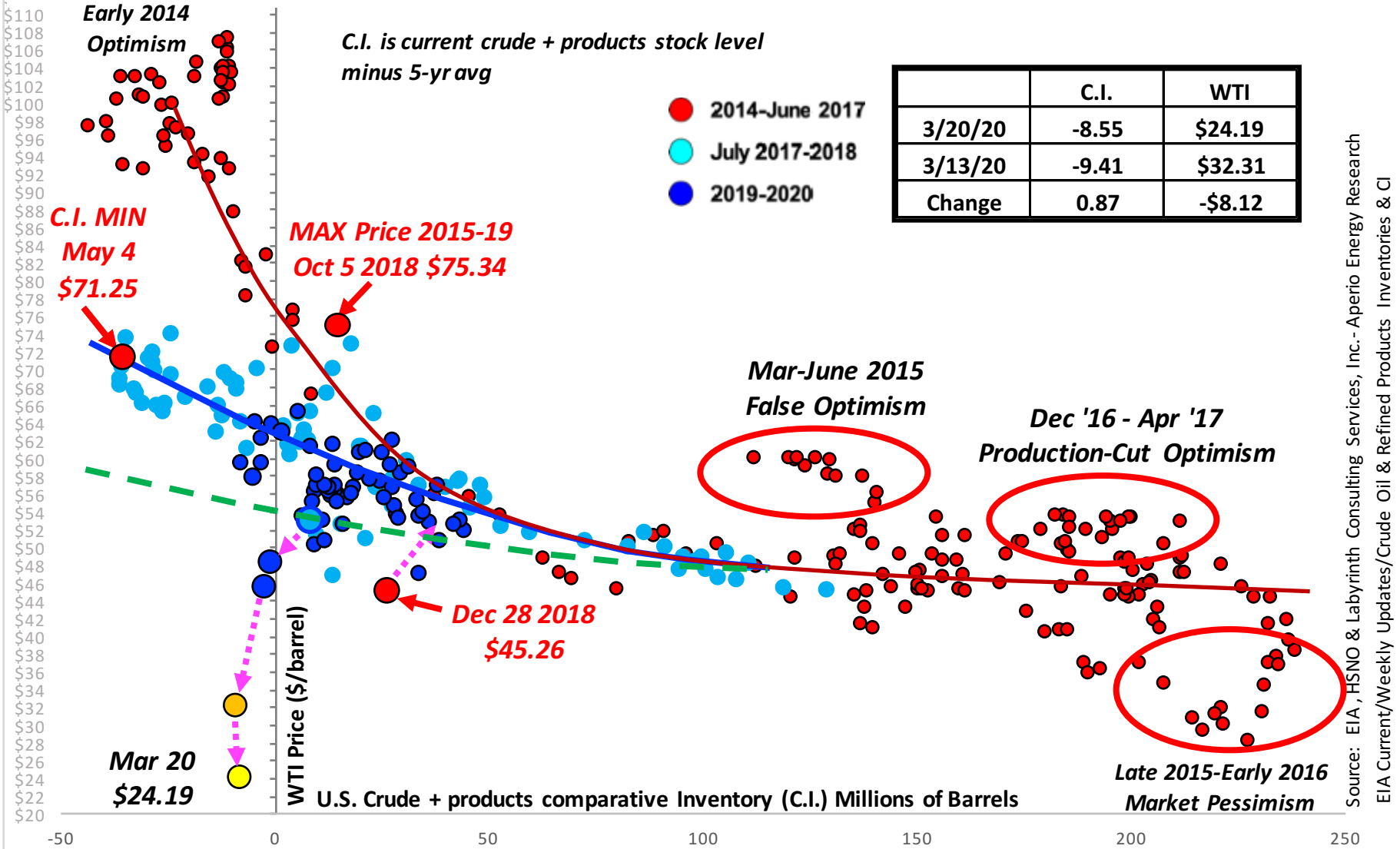
Markets have already priced-in upcoming inventory build with WTI price in $20 range
18 months from 5-year average to comparative inventory peak Oct 2014-Feb 2016
A similar trajectory suggests peak U.S. oil storage in July 2021



Source: EIA & Labyrinth Consulting Services, Inc.

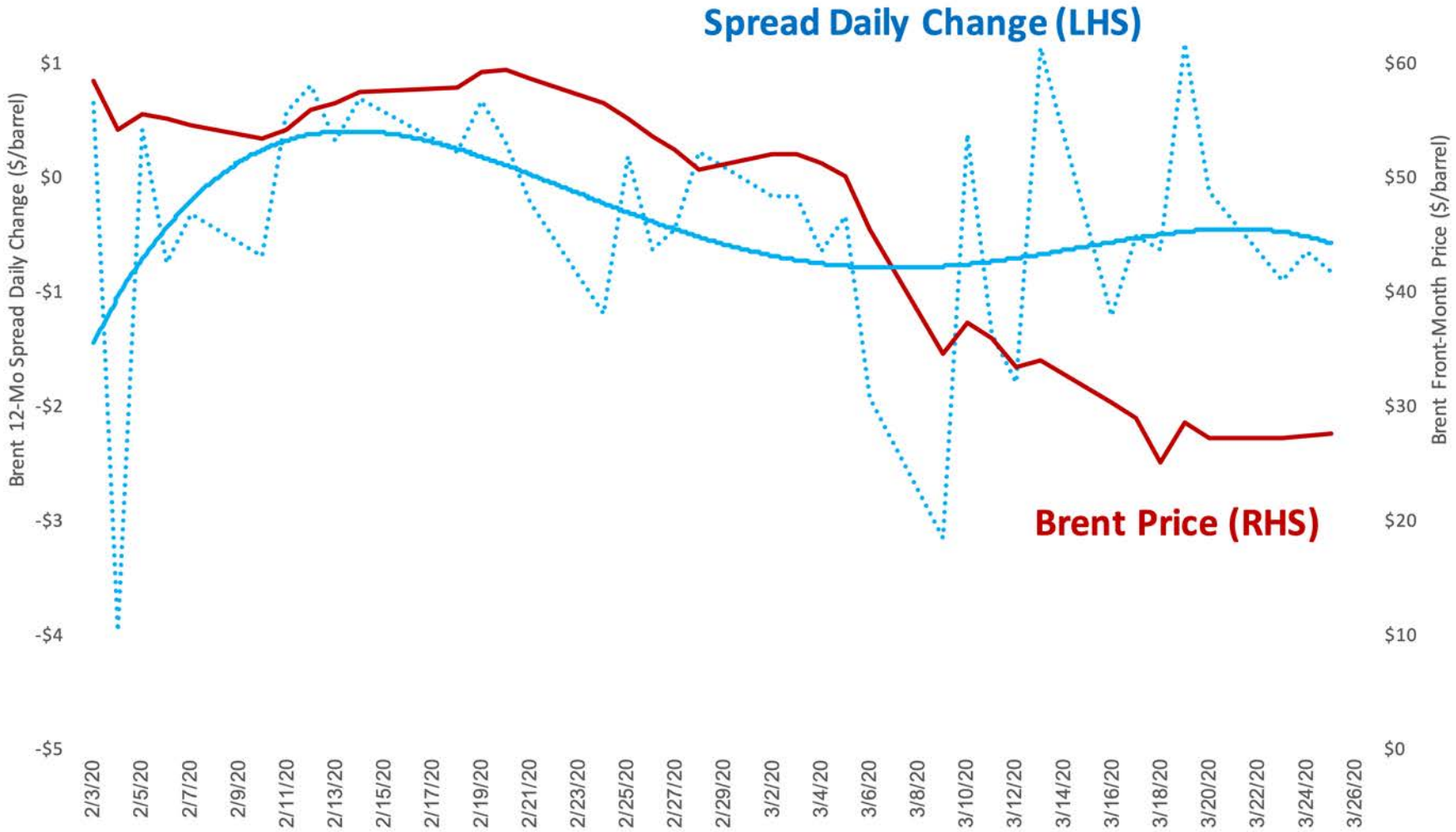
EIA Current/Weekly Updates/Crude Oil & Refined Products Inventories & CI

WTI remains in price-discovery although rate of price decline slowed this week
Comparative inventory increased (slightly) first time in a month week ending March 20
WTI is at least $20 under-valued at $24 based on green C.I. yield curve



	C.I.	WTI
3/20/20	-8.55	$24.19
3/13/20	-9.41	$32.31
Change	0.87	-$8.12

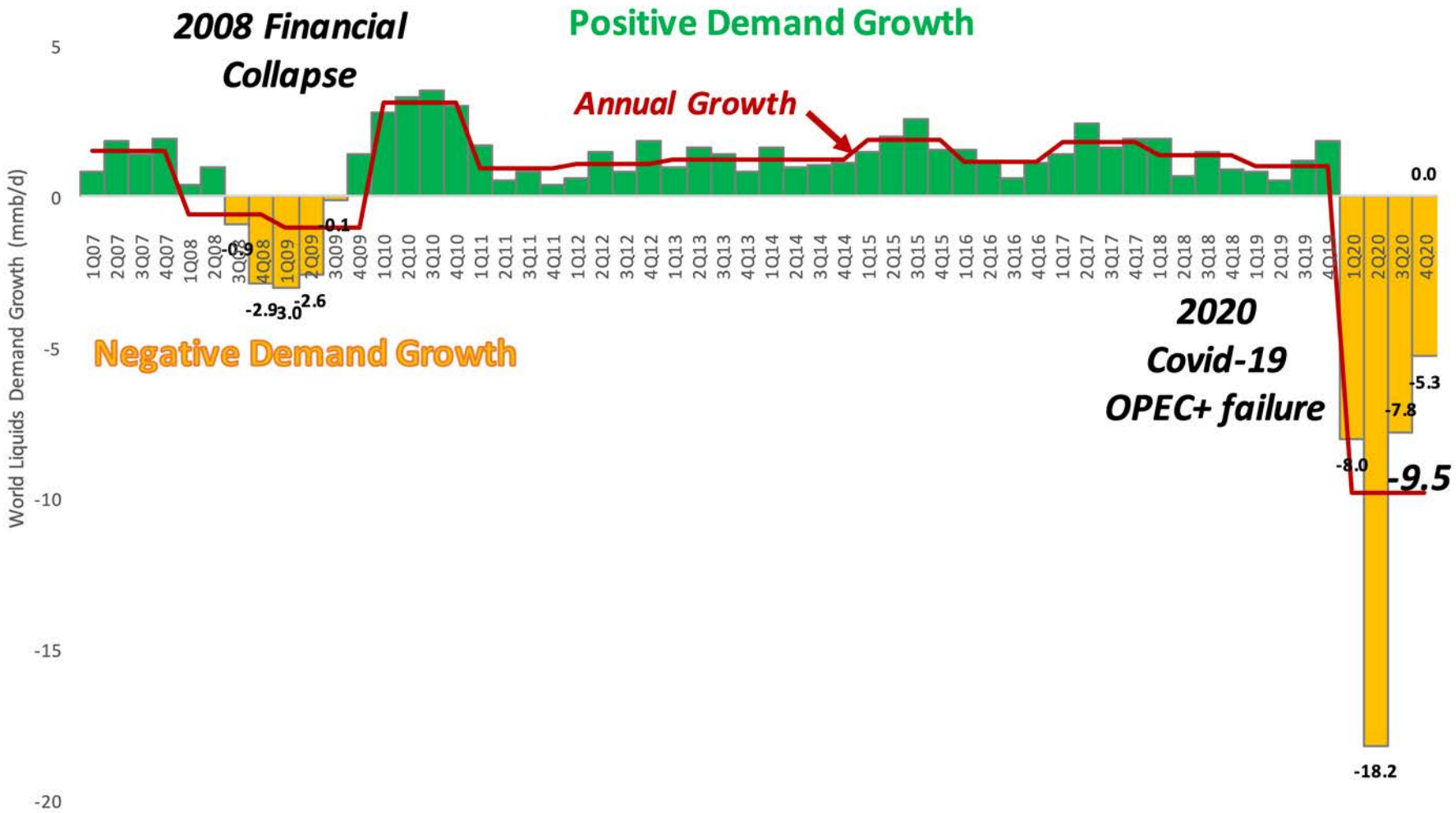
Brent price fall has flattened but 12-month spreads show a higher-frequency cyclicity
Suggests potential for another downward trend later this week or early next
It will probably be less acute than previous price declines



Source: Quandl & Labyrinth Consulting Services, Inc.

Oil & Gas General/Futures & Future Spreads/BZ1-BZ12 FUTURES

-9.5 mmb/d world liquids y-o-y demand contraction likely in 2020
-8 mmb/d in Q1, -18 mmb/d in Q2 & -8 mmb/d in Q3 and -5 mmb/d in Q4

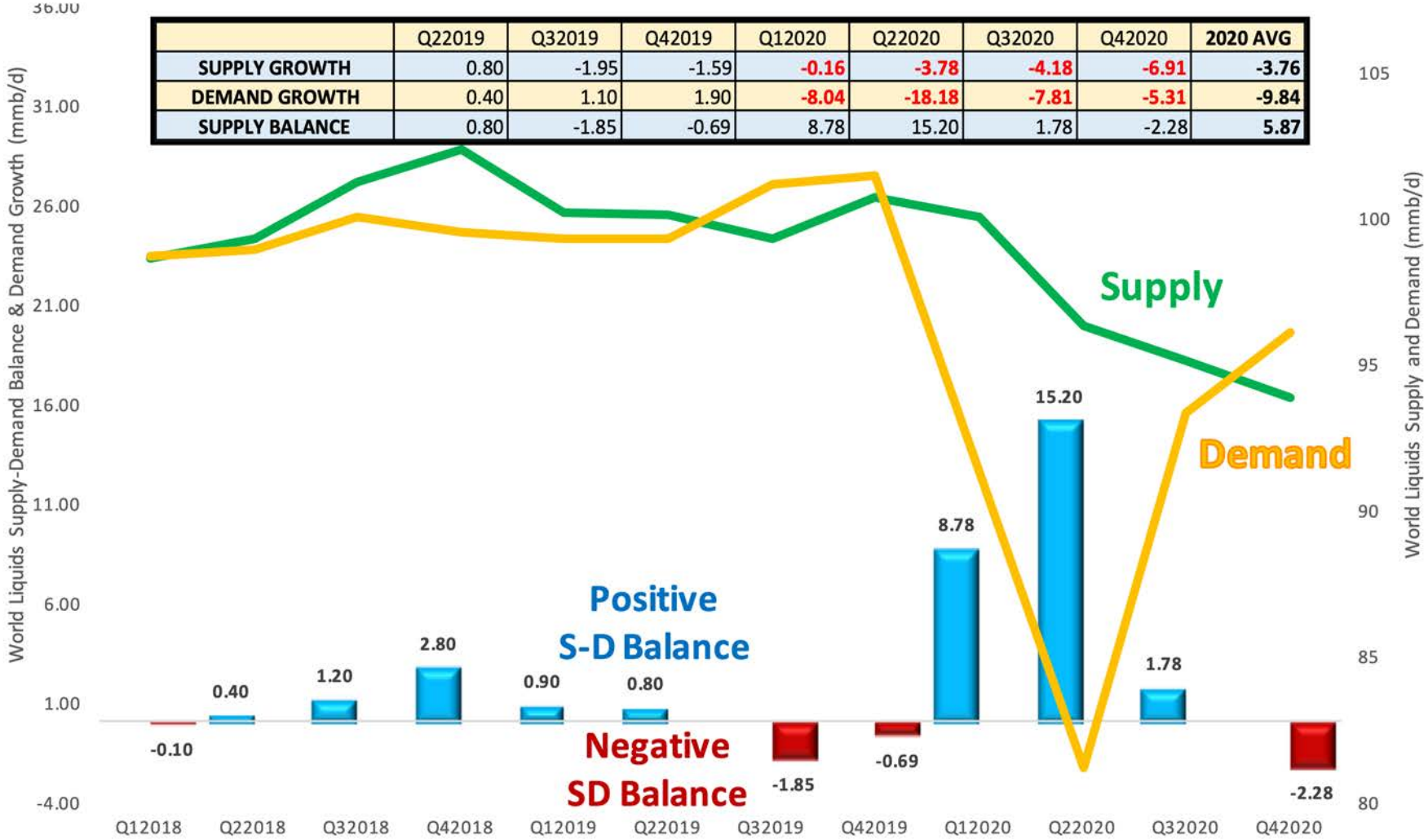


Source: OPEC, IEA, EIA, Vitol, Trafigura, Rystad & Labyrinth Consulting Services

EIA International/EIA Supply & Demand Master

IH 2020 supply-demand surplus likely to be greatest since 1985
Q1 world over-supply may be as much as 9 mmb/d and Q2 near 5 mmb/d
Reasonable hope for return to market balance in 2H

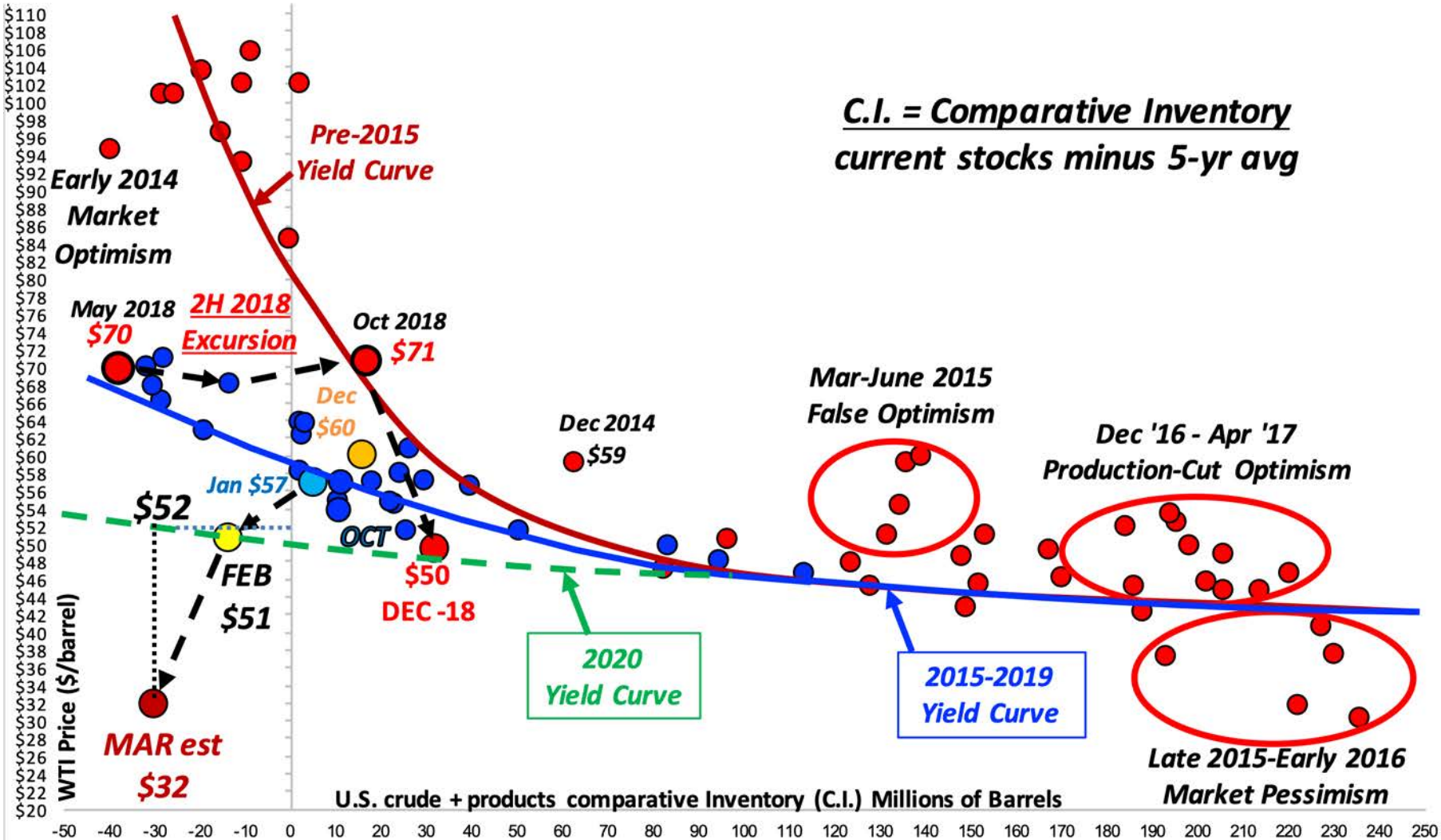
	Q22019	Q32019	Q42019	Q12020	Q22020	Q32020	Q42020	2020 AVG
SUPPLY GROWTH	0.80	-1.95	-1.59	-0.16	-3.78	-4.18	-6.91	-3.76
DEMAND GROWTH	0.40	1.10	1.90	-8.04	-18.18	-7.81	-5.31	-9.84
SUPPLY BALANCE	0.80	-1.85	-0.69	8.78	15.20	1.78	-2.28	5.87



Source: OPEC, IEA, EIA, Vitol, Trafigura, Goldman Sachs & Labyrinth Consulting Services

EIA International/EIA Supply & Demand Master

WTI $23 front-month price is ~$30.00 under-valued based on monthly data on the green 2020 comparative inventory yield curve



Source: EIA & Labyrinth Consulting Services, Inc.

EIA Current/Monthly Updates/MER/ Table_3.4_Petroleum Stocks_MASTER