



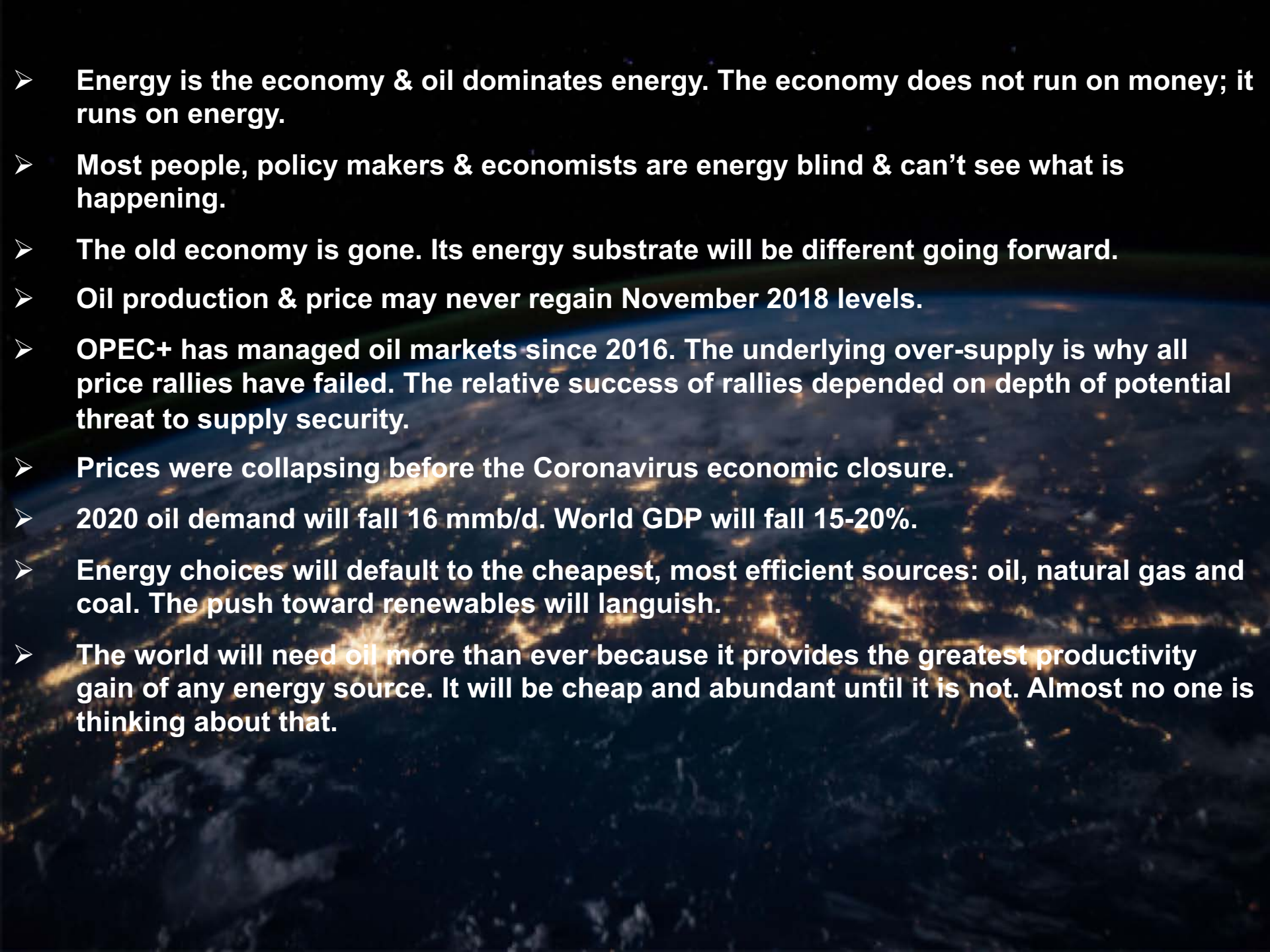
Art Berman

Oil-markets During & After Coronavirus

SPE Gulf Coast Section

April 20, 2020

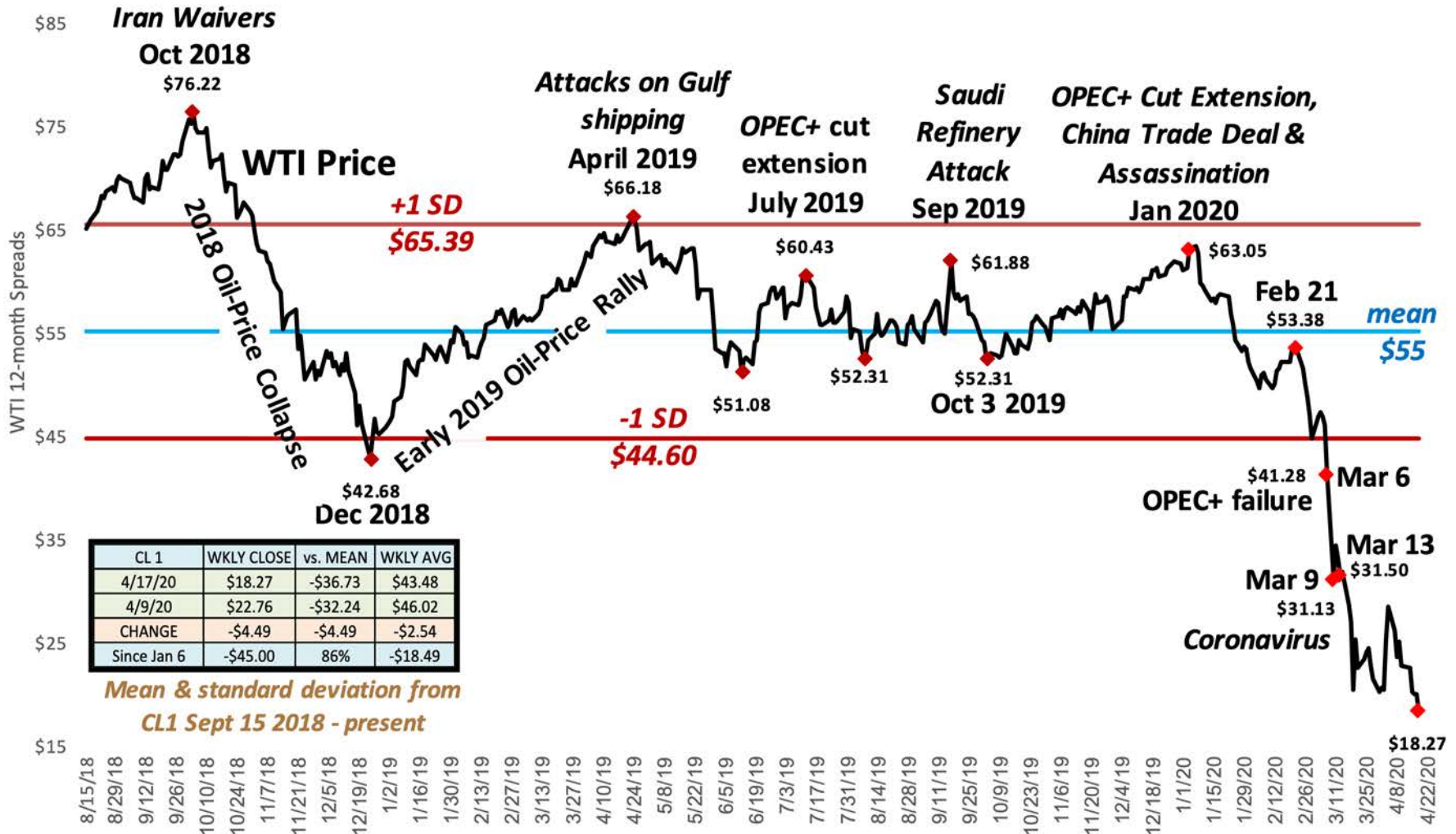


- 
- **Energy is the economy & oil dominates energy. The economy does not run on money; it runs on energy.**
 - **Most people, policy makers & economists are energy blind & can't see what is happening.**
 - **The old economy is gone. Its energy substrate will be different going forward.**
 - **Oil production & price may never regain November 2018 levels.**
 - **OPEC+ has managed oil markets since 2016. The underlying over-supply is why all price rallies have failed. The relative success of rallies depended on depth of potential threat to supply security.**
 - **Prices were collapsing before the Coronavirus economic closure.**
 - **2020 oil demand will fall 16 mmb/d. World GDP will fall 15-20%.**
 - **Energy choices will default to the cheapest, most efficient sources: oil, natural gas and coal. The push toward renewables will languish.**
 - **The world will need oil more than ever because it provides the greatest productivity gain of any energy source. It will be cheap and abundant until it is not. Almost no one is thinking about that.**

Five oil rallies failed from mid-2018 to early 2020

2018 oil-price collapse was strongest possible signal to producers

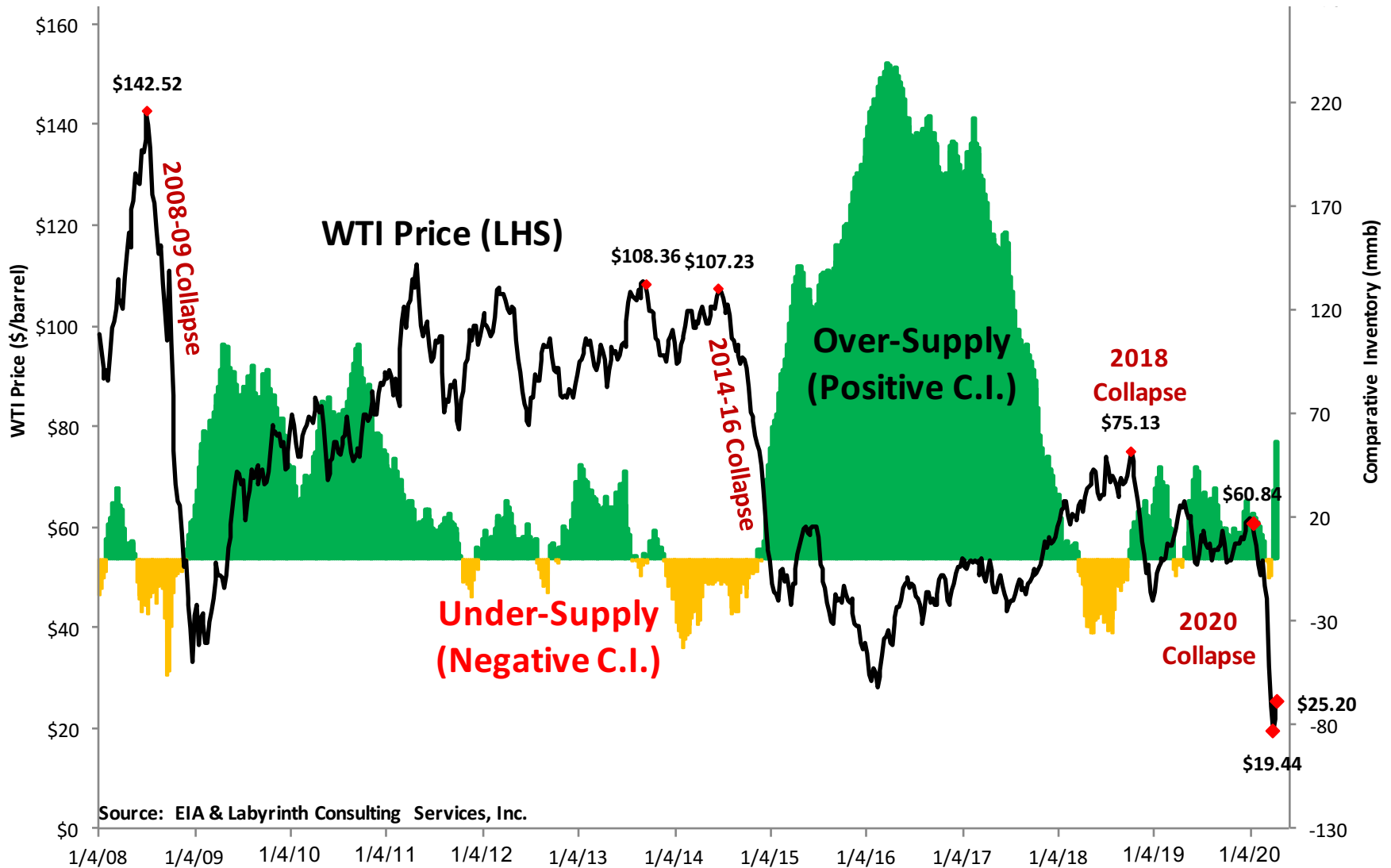
Prices fell to \$30 from OPEC+ failure before Coronavirus national emergency



Source: Quandl & Labyrinth Consulting Services, Inc.

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

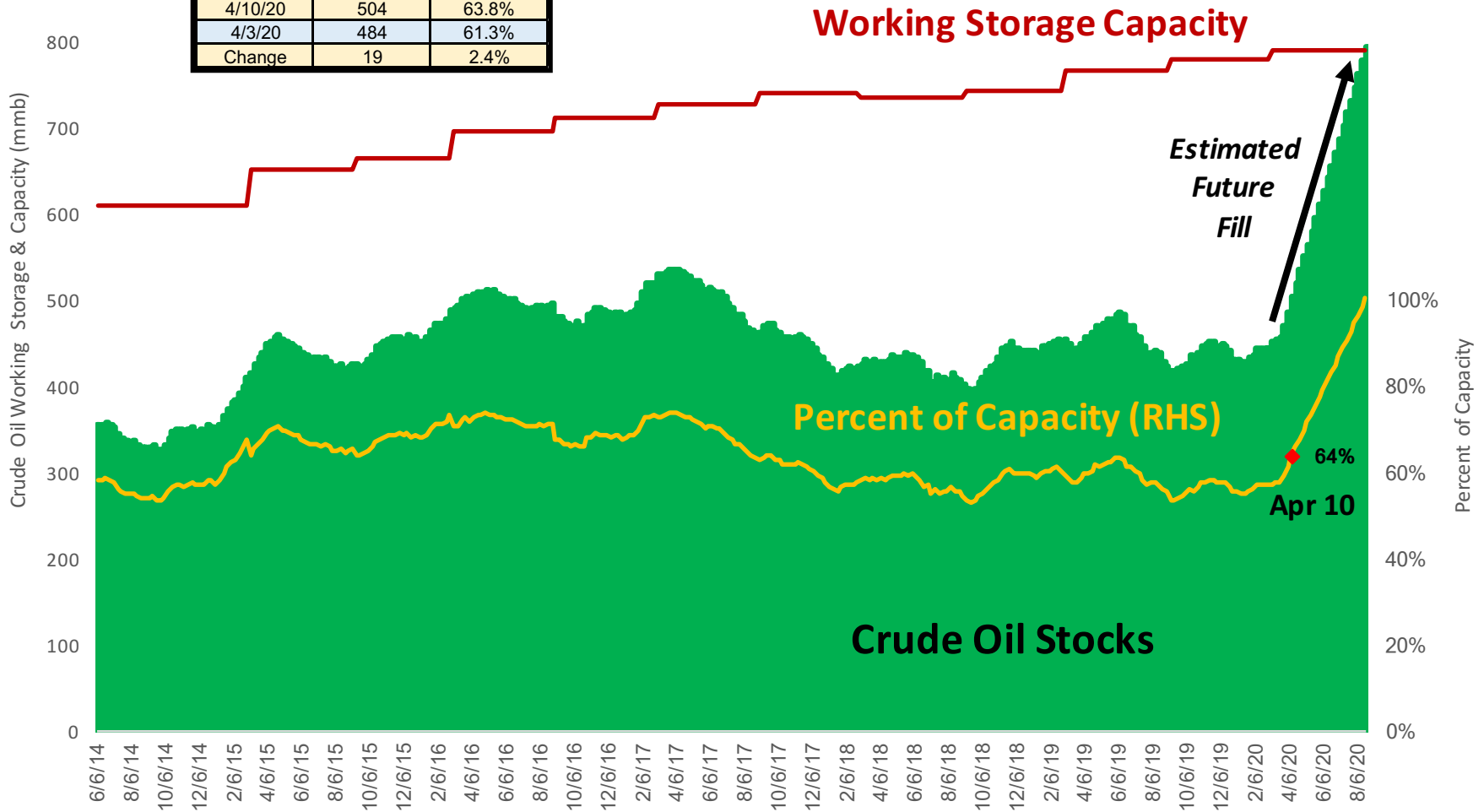
**Markets have already priced-in coming inventory increase
 Similar pattern to 2008, 2014 and 2018
 but this time there is greater certainty about timing & levels**



EIA 2019/Weekly Updates/Crude Oil & Refined Products Inventories & CI

Crude storage will take 19 weeks (August) to reach capacity at current rate of increase
U.S. storage increased +19 mmb (+2.4%) to 64% of capacity week ending April 10
Does not include available capacity in strategic petroleum reserve

	Stocks	Pct Capacity
4/10/20	504	63.8%
4/3/20	484	61.3%
Change	19	2.4%



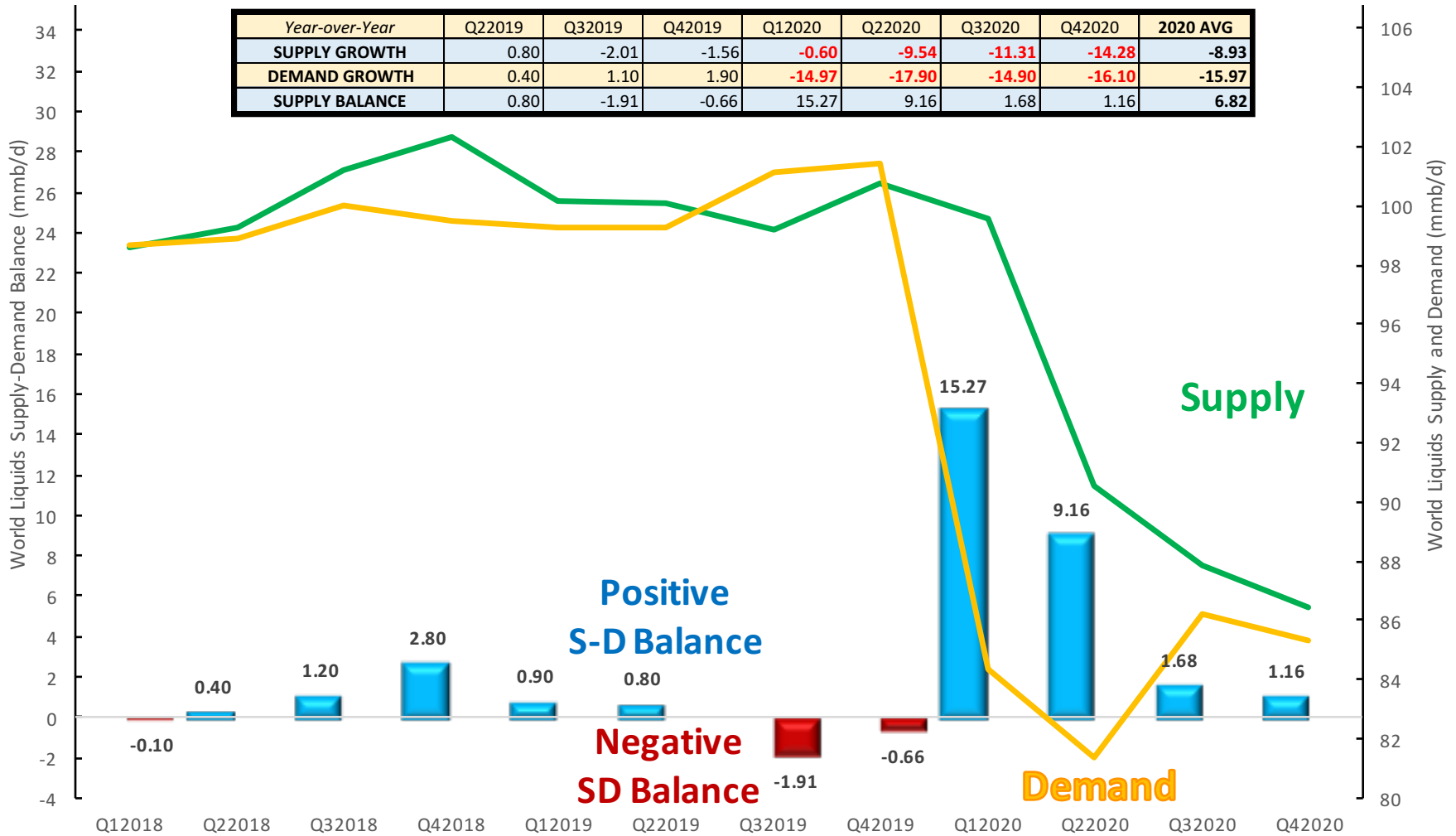
Source: EIA & Labyrinth Consulting Services, Inc.

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

OPEC+ production agreement is largely irrelevant

Producers will be forced to cut production because of low price and low demand

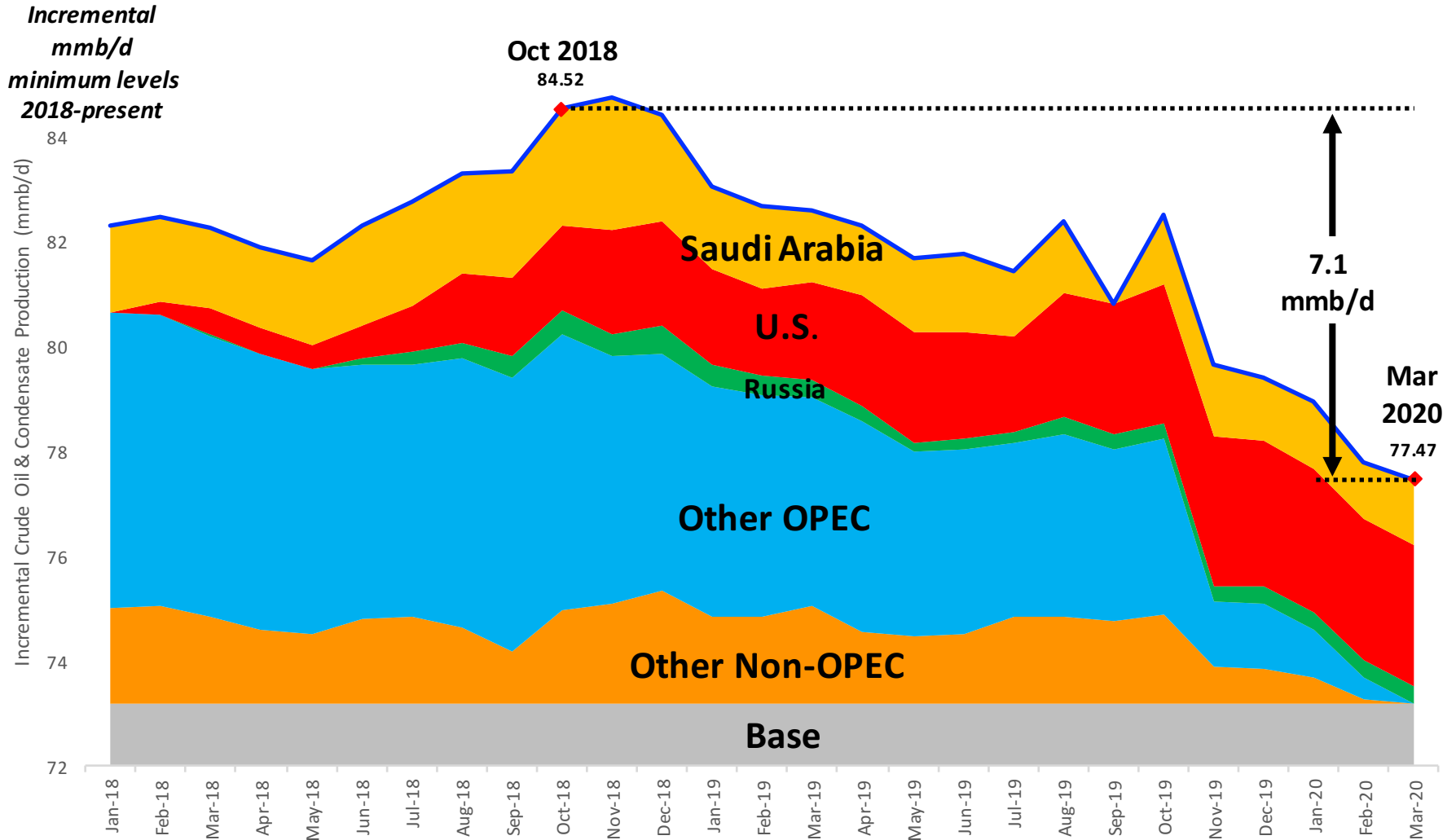
Supply-demand balance will improve in 2H 2020 but markets will remain over-supplied



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

EIA International/EIA Supply & Demand Master

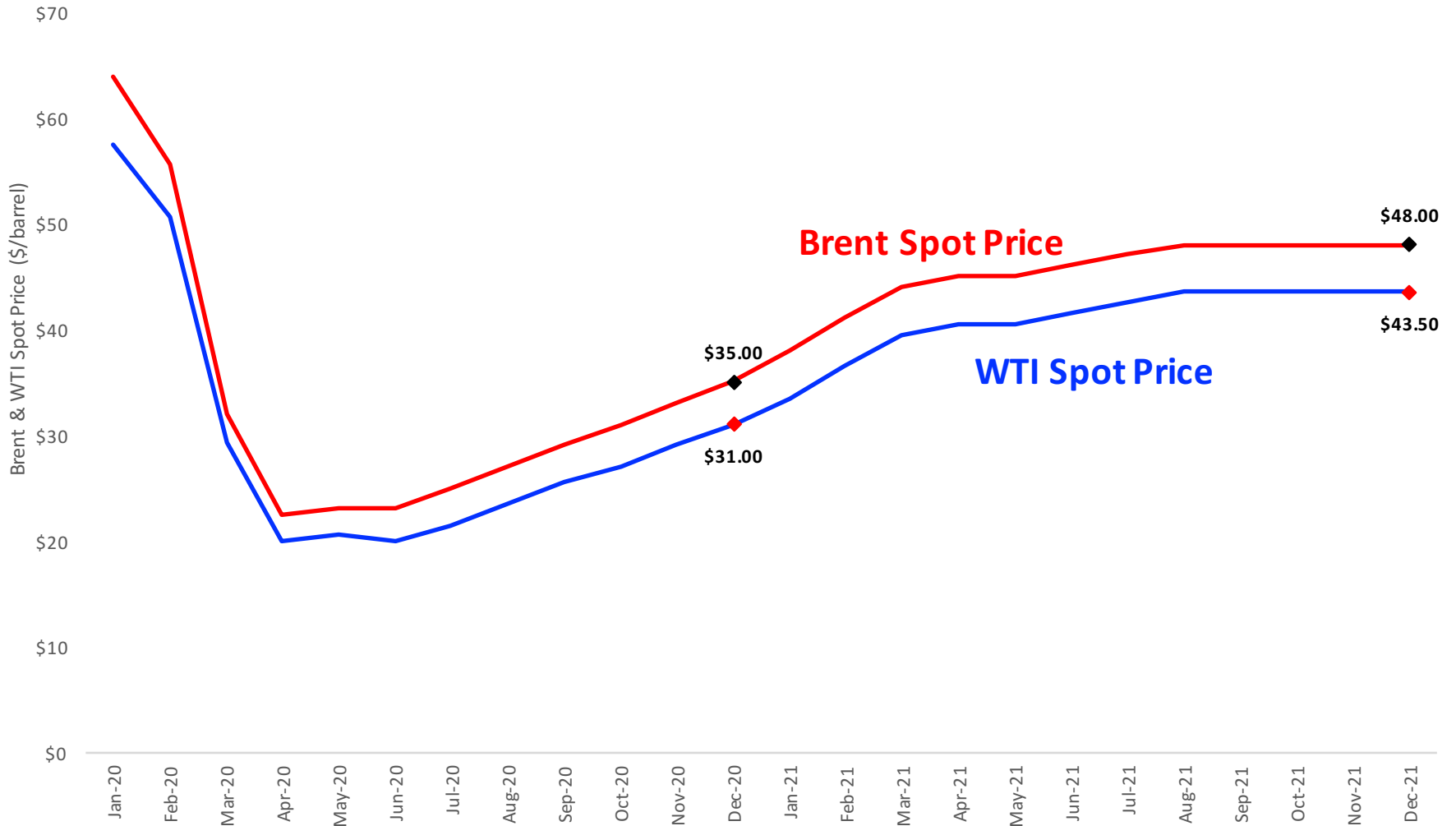
OPEC+ production cut is a fiction that only removes 2.6 mmb/d from world supply
Cuts based on October 2018 levels 7.1 mmb/d higher than present
9.7 mmb/d cut only 2.6 mmb/d less than March levels



Source: EIA & Labyrinth Consulting Services, Inc.

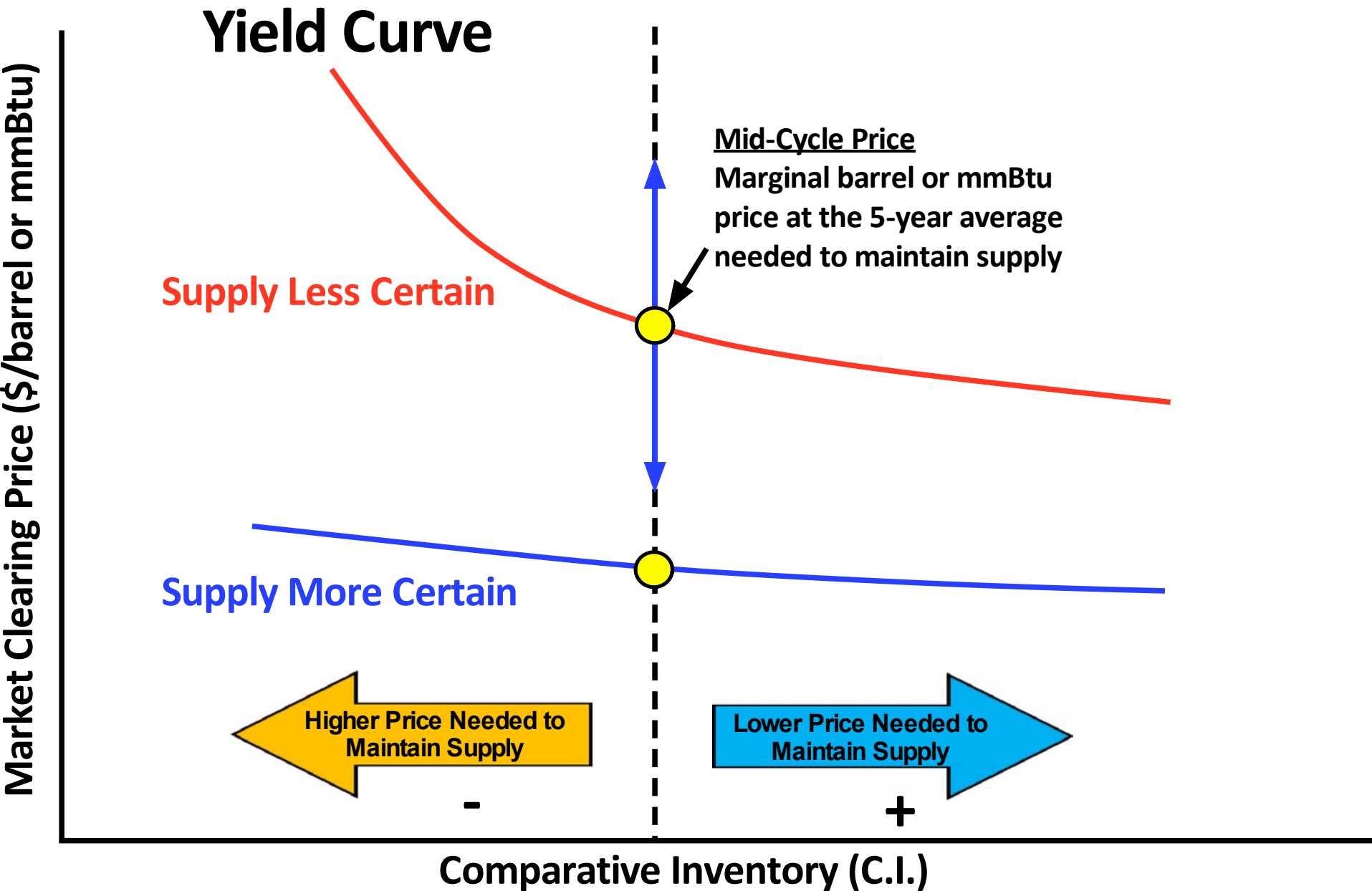
EIA/EIA International/International_data MASTER_2020

EIA expects WTI spot price to average \$30 in 2020 and \$41 in 2021 Brent expected to average \$33 in 2020 and \$46 in 2021



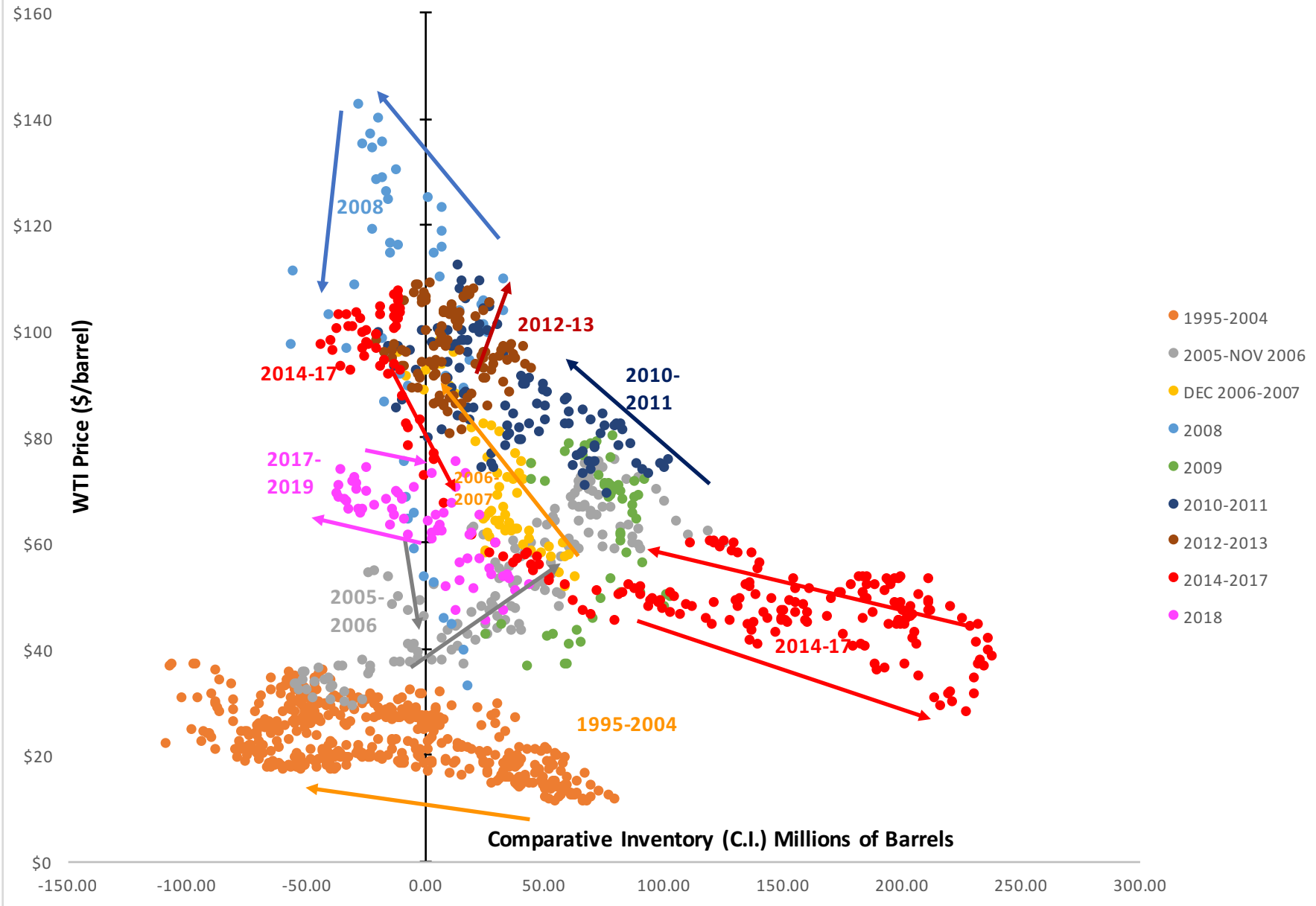
Source: EIA STEO & Labyrinth Consulting Services, Inc.

EIA Current/STEO/STEO Master.xlsx



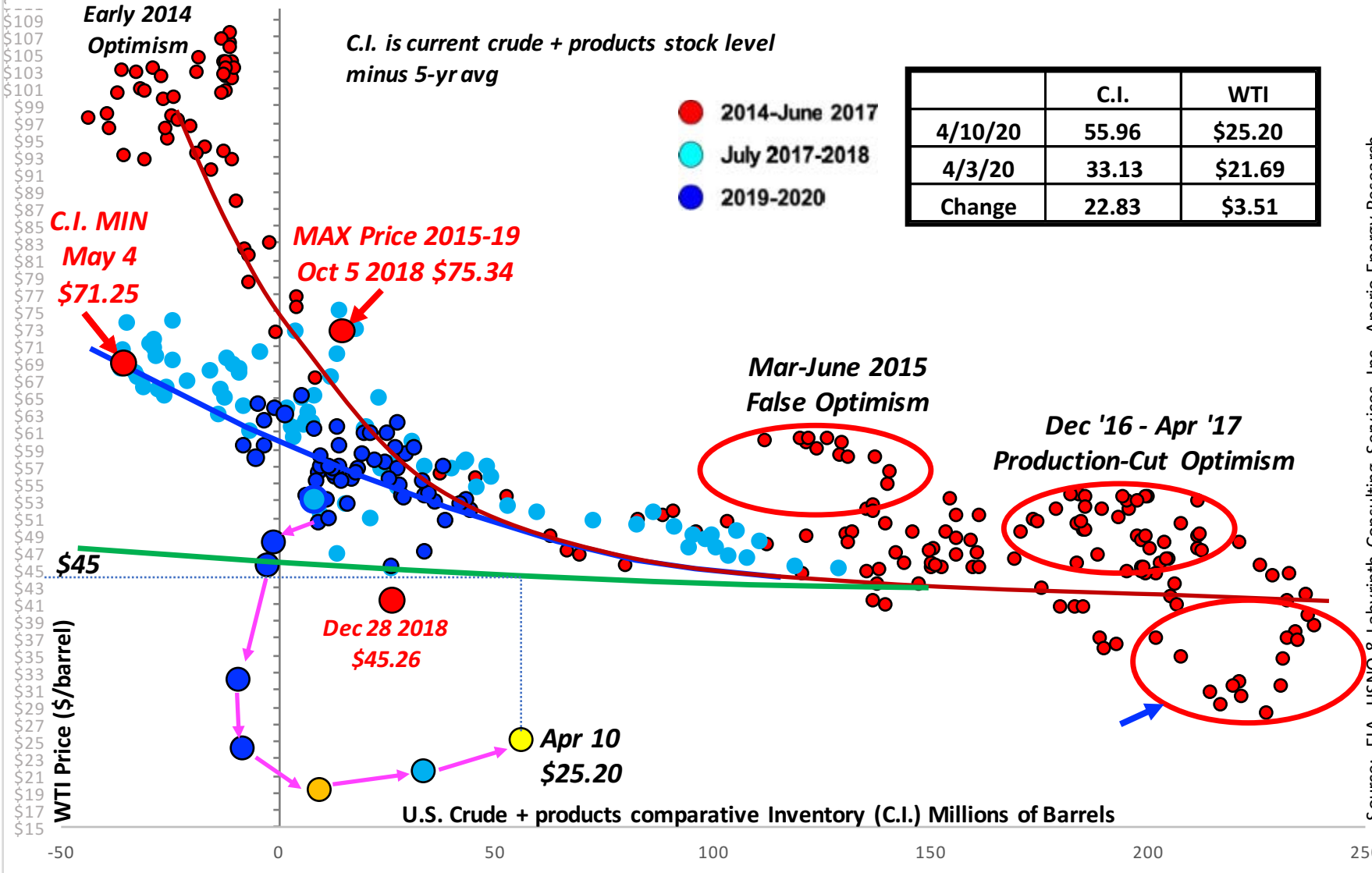
Source: Aperio Energy Research & Labyrinth Consulting Services, Inc.

Nine Price Cycles Defined by Comparative Inventory vs WTI Price from 1995-2019



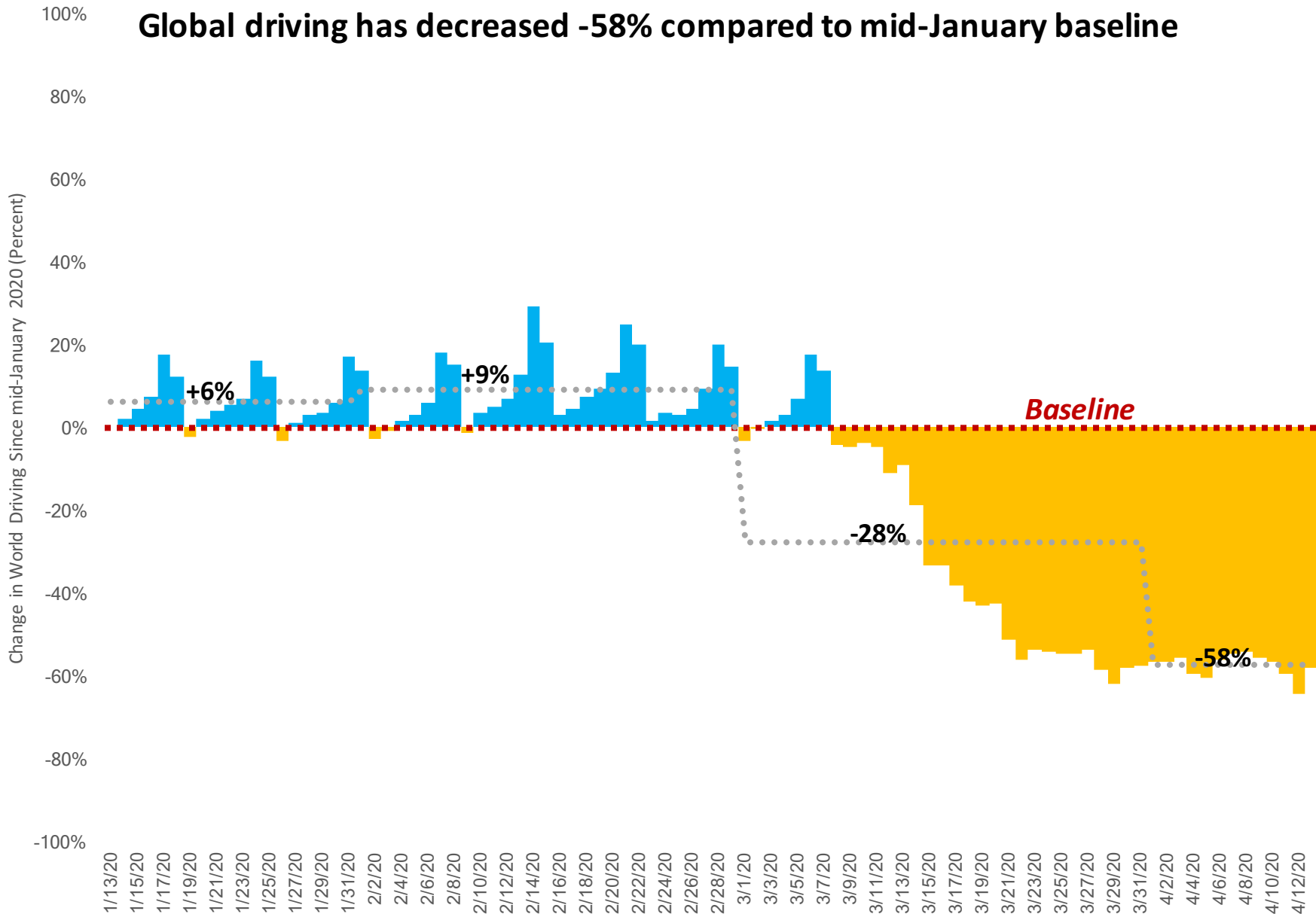
Source: EIA & Labyrinth Consulting Services, Inc.-Aperio Energy Research

WTI ~ \$20 under-priced at \$25 spot price based on green C.I. yield curve
Front-month price of \$19.44 is \$29 under-priced
2020 price-discovery excursion ~50% vs late 2015-16 excursion ~33%



Source: EIA, HSN0 & Labyrinth Consulting Services, Inc. - Aperio Energy Research
 EIA Current/Weekly Updates/Crude Oil & Refined Products Inventories & CI

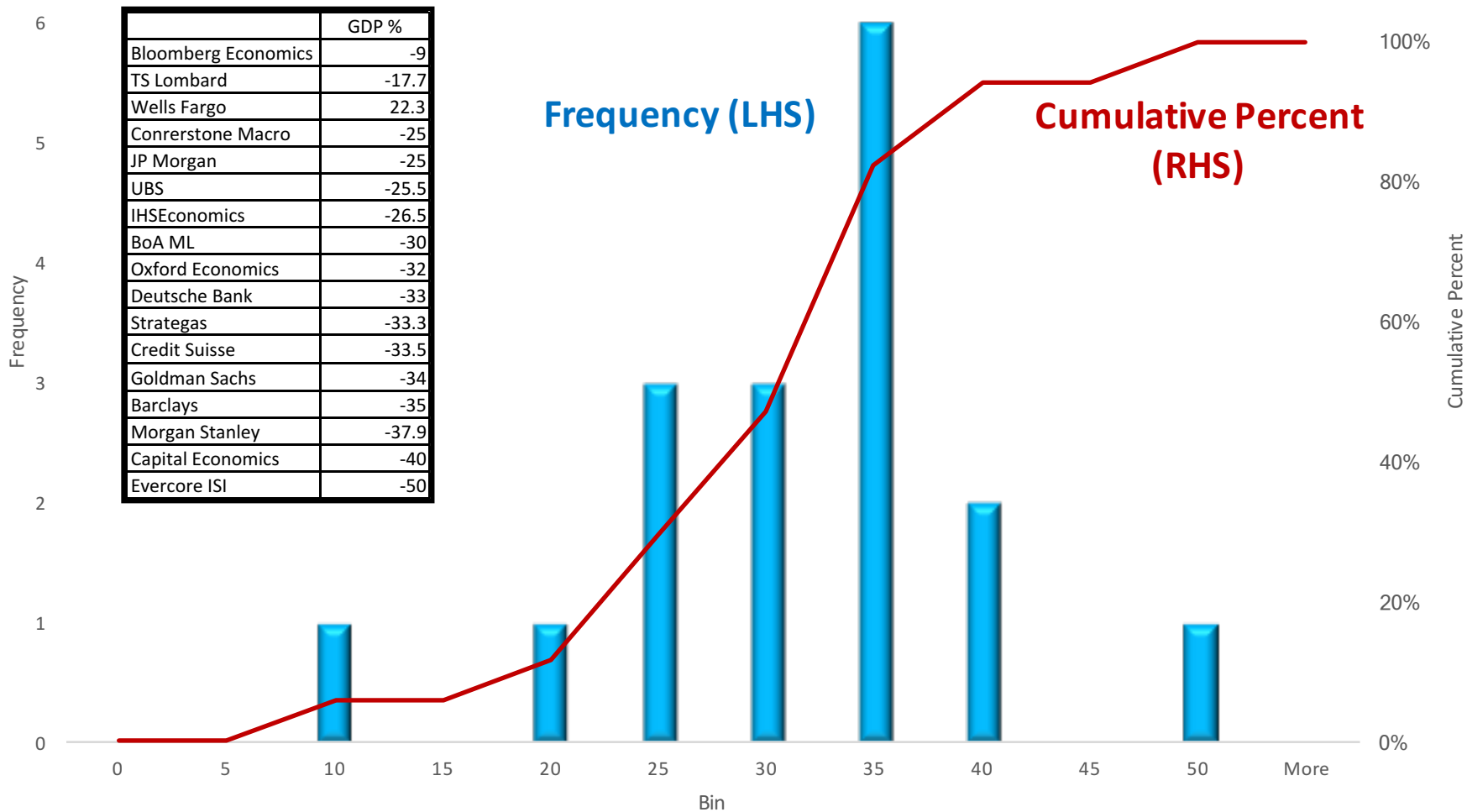
Global driving has decreased -58% compared to mid-January baseline



Source: Apple & Labyrinth Consulting Services, Inc.

Oil & Gas General/Apple Mobility Trends

U.S. GDP expected to contract 30-35% based on estimates by 17 investment analysts

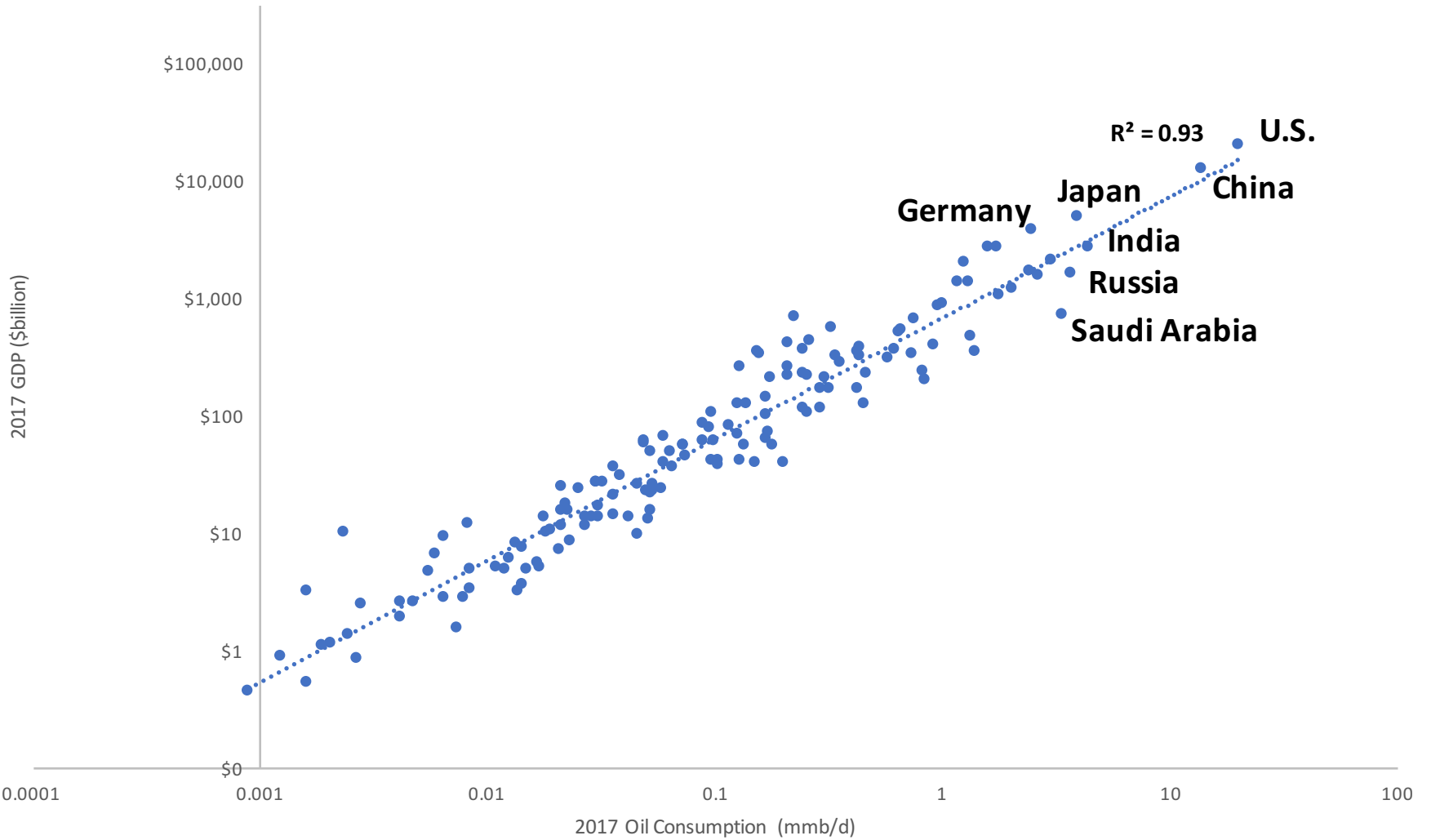


Source: Charles Schwab & Labyrinth Consulting Services, Inc.

Oil & Gas General/GDP/2020 GDP Estimates

GDP is proportional to oil consumption

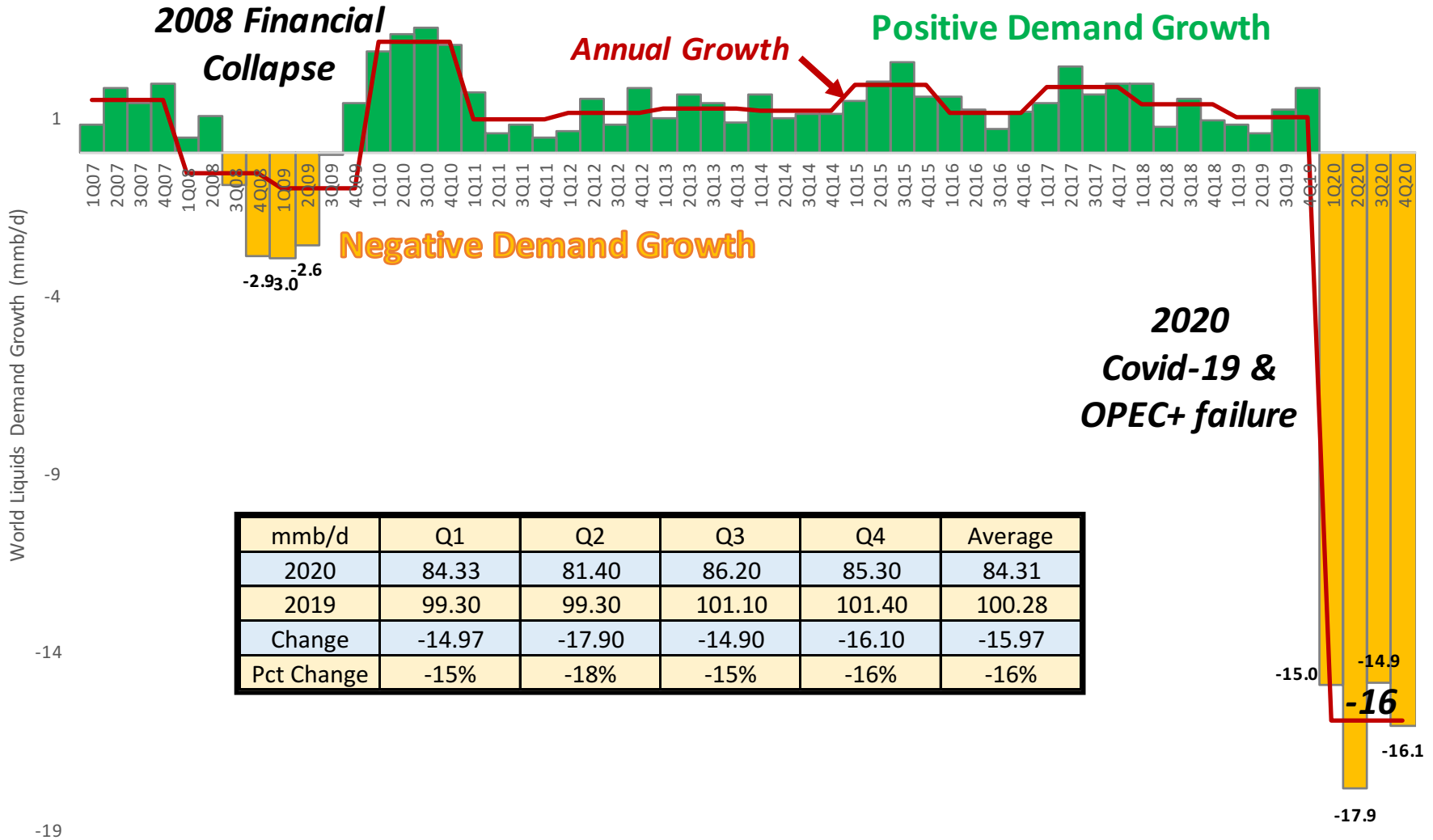
Logarithmic Scales



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

Oil & Gas General/GDP VS OIL CONSUMPTION 2017

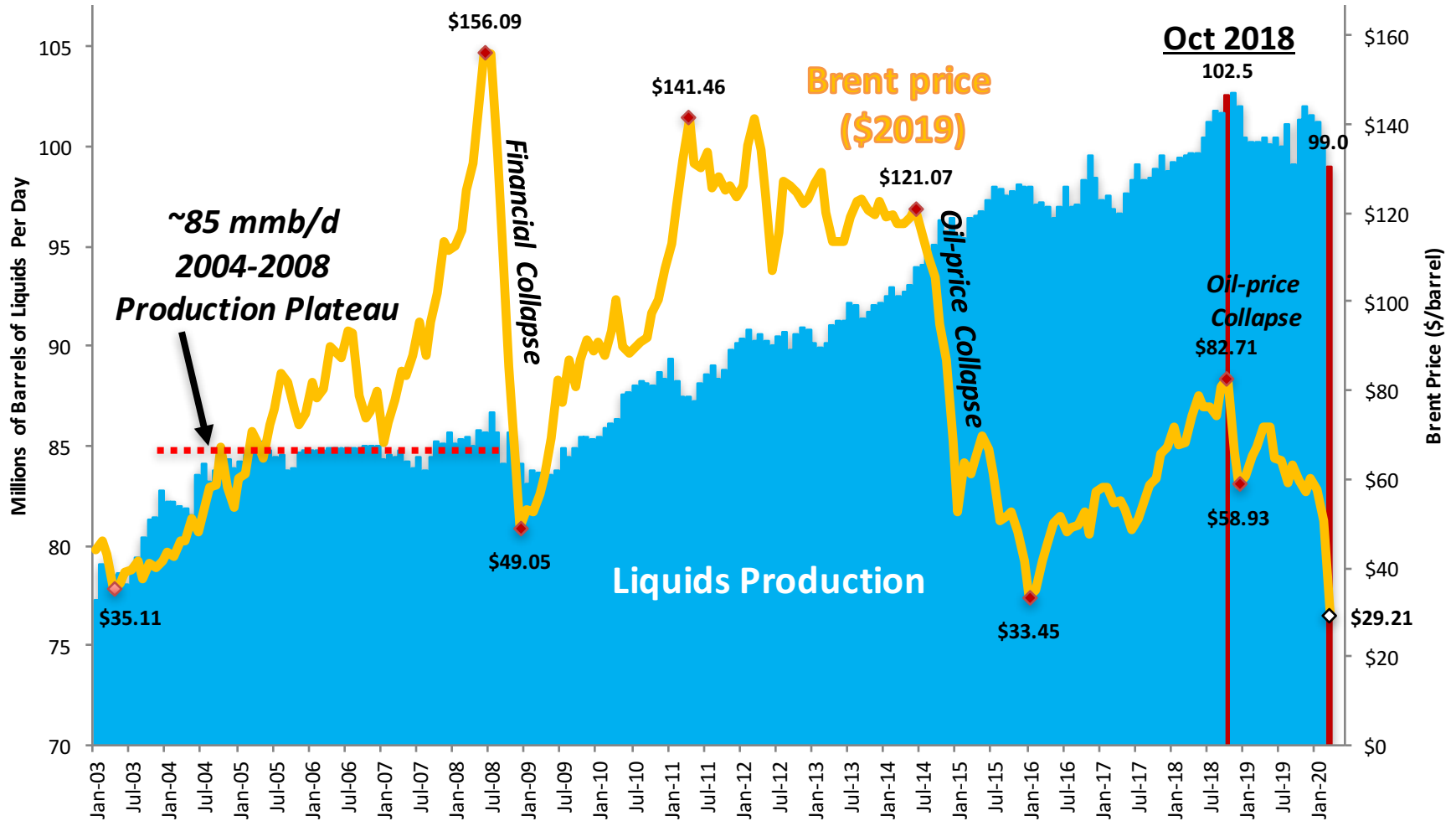
**-16% contraction in global GDP is likely
based on strong correlation between oil consumption and GDP**



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

EIA International/EIA Supply & Demand Master

October 2018 was probably the peak of global oil production
Created by artificial supply urgency by U.S. withdrawal from Iran nuclear pact
Failure to deliver on sanctions caused a major price collapse



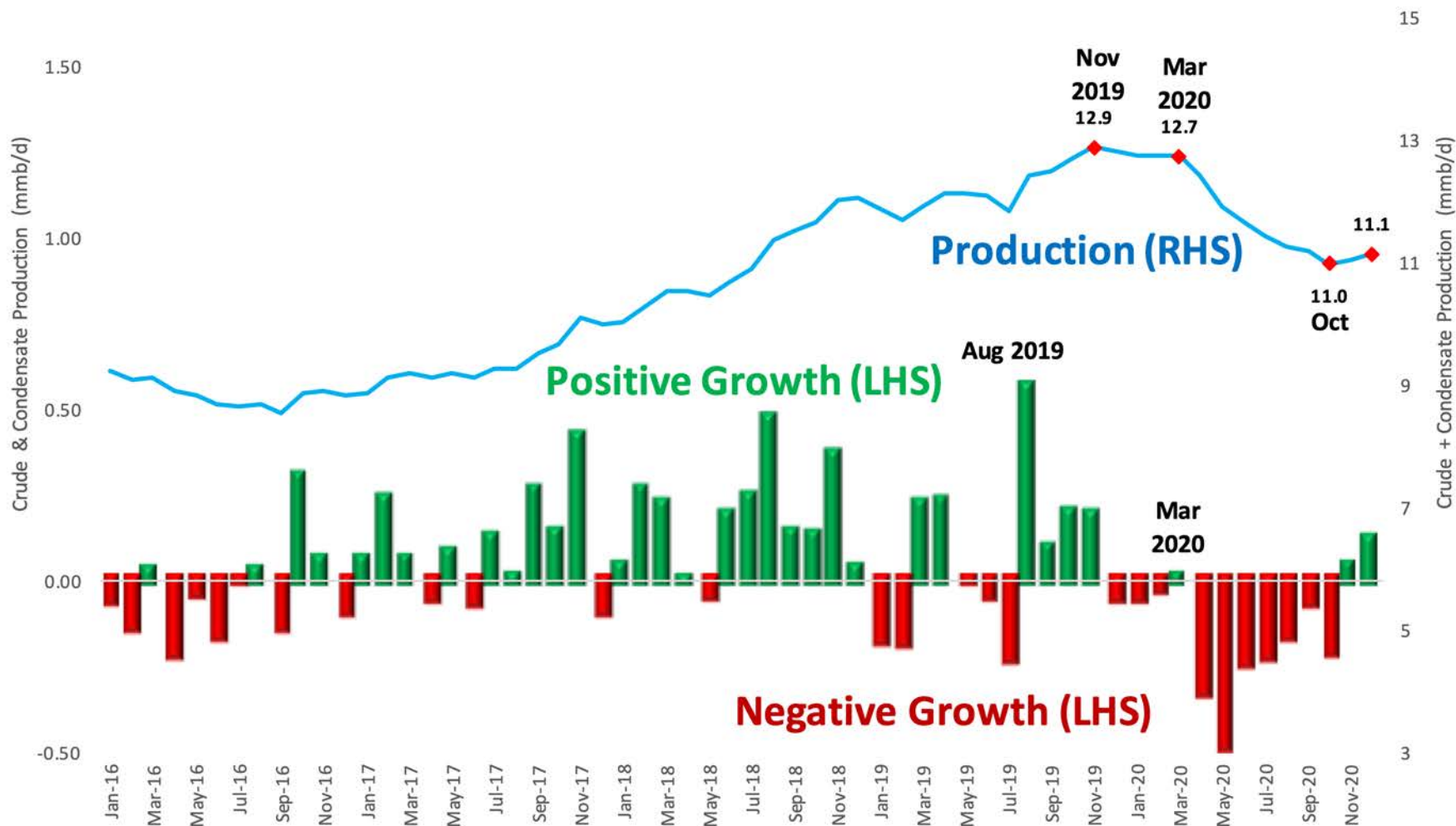
Source: EIA STEO & Labyrinth Consulting Services, Inc.

EIA Current/STEO/STEO Master.xlsx

U.S. oil production increased +10 kb/d to 12.7 mmb/d in March

Negative production growth expected through October

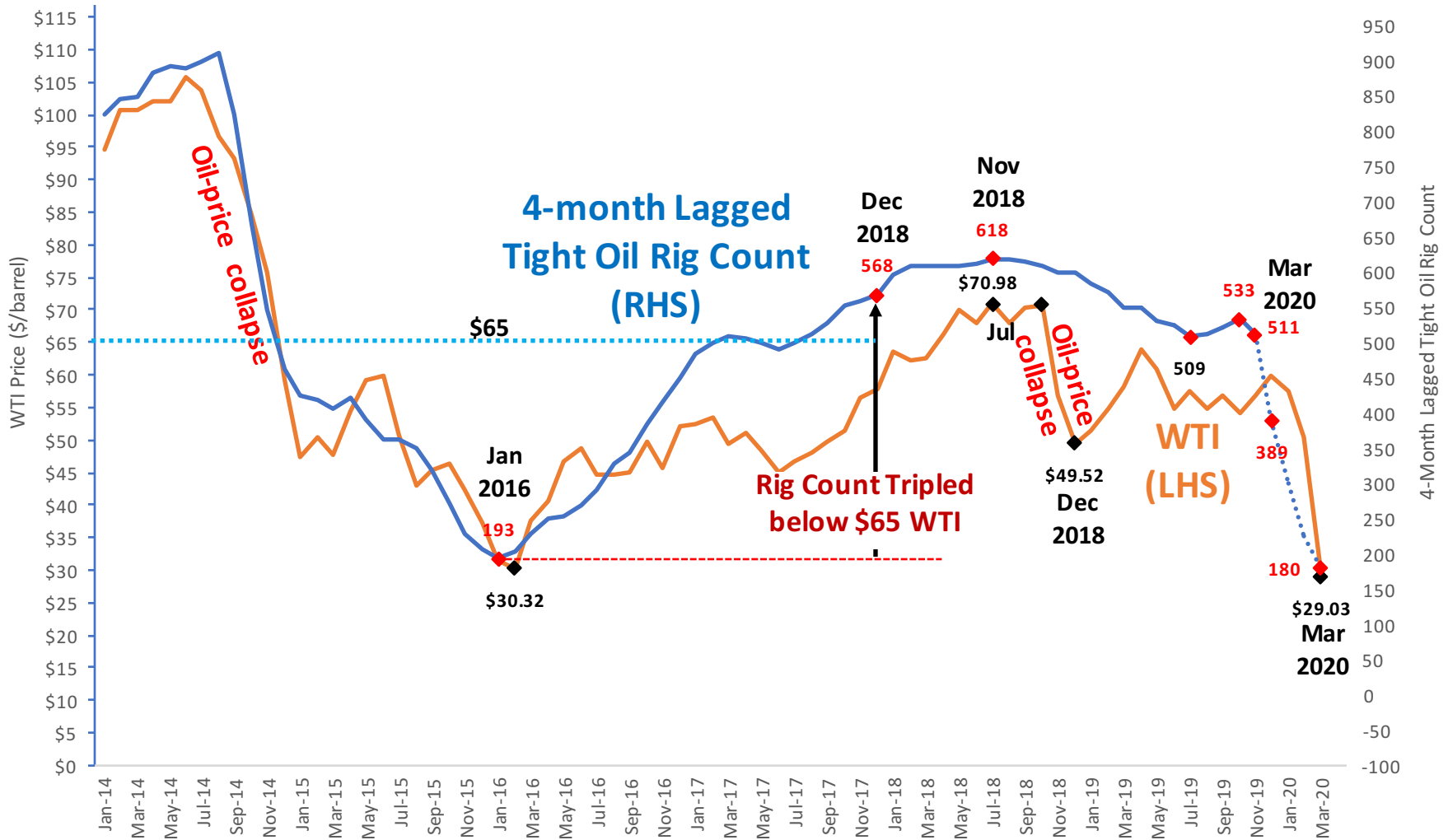
with year-end production -1.5 mmb/d lower at 11.1 mmb/d



Source: EIA STEO & Labyrinth Consulting Services, Inc.

EIA Current/STEO/STEO Master.xlsx

Tight oil rig count has fallen -122 (-24%) to 389 in first 2 weeks of April It may fall another 200 in coming months based on WTI spot price-to-lagged rig count correlation



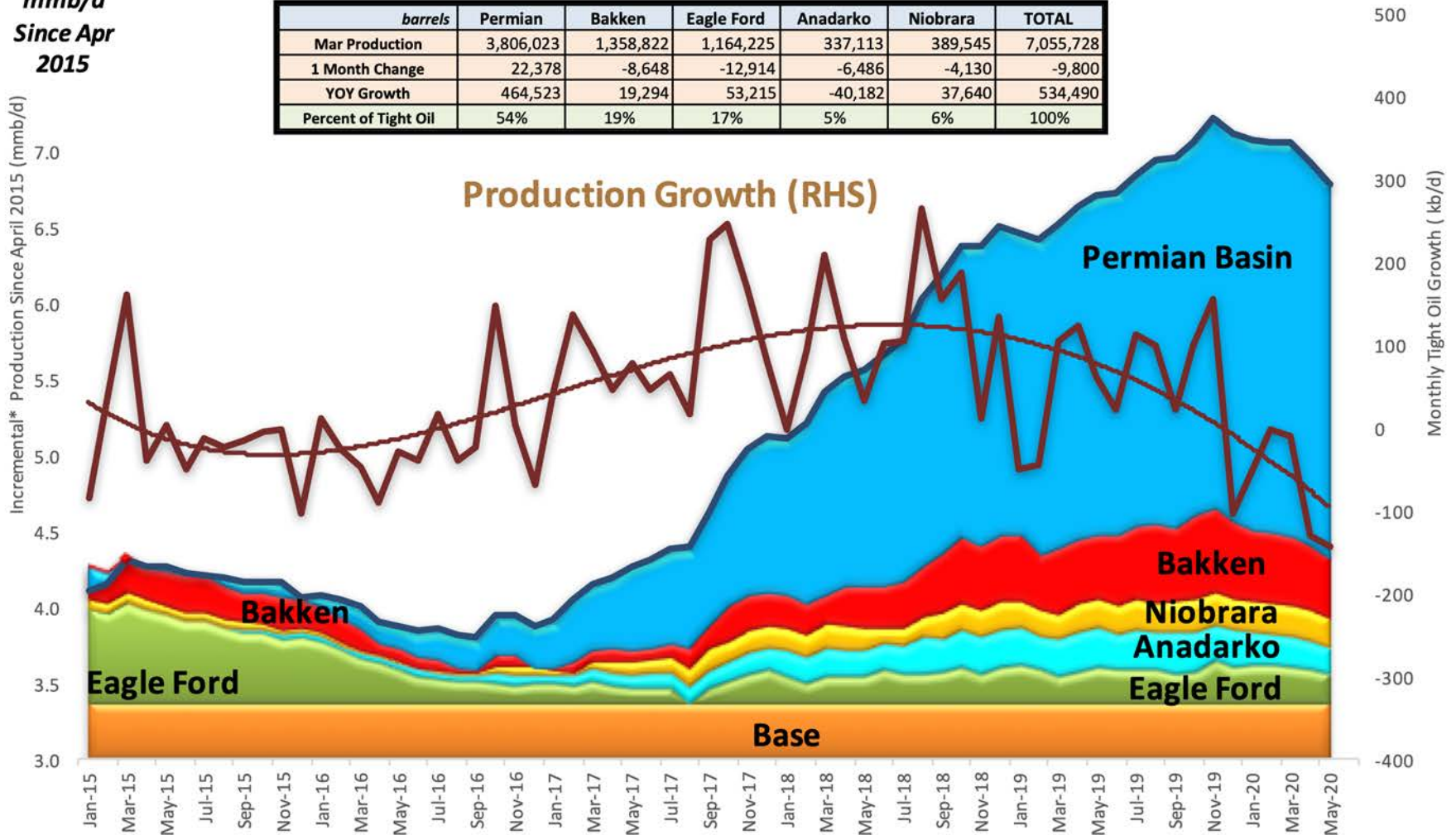
Source: Baker Hughes, EIA DPR, Drilling Info & Labyrinth Consulting Services, Inc.

Rig Count/Rig Count 2019/MONTHLY SHALE GAS-TIGHT OIL RIG COUNT

March U.S. tight oil production decreased -10 kb/d from 7.07 to 7.06 mmb/d
April output estimated at 6.93 mmb/d
April & May growth expected to average -137 kb/d

**Incremental
mmb/d
Since Apr
2015**

barrels	Permian	Bakken	Eagle Ford	Anadarko	Niobrara	TOTAL
Mar Production	3,806,023	1,358,822	1,164,225	337,113	389,545	7,055,728
1 Month Change	22,378	-8,648	-12,914	-6,486	-4,130	-9,800
YOY Growth	464,523	19,294	53,215	-40,182	37,640	534,490
Percent of Tight Oil	54%	19%	17%	5%	6%	100%



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

EIA Current/DUC-DPR/dpr-data_MASTER

High Necessity	<p>Work from Home Manufacturing & Construction Pharmacies Big-box & Hardware Stores Auto Repair Shops Liquor stores Banks</p>	<p>Supermarkets & grocery stores Hospitals, Medical Care Daycare Schools Food Supply & Distribution Goods Distribution</p>
Low Necessity	<p>Home Entertainment Social Phone & Video Meetings Convenience Stores & Gas Stations</p>	<p>Tourism-Air Travel-Cruises Bars, Restaurants Movie Theaters Sporting Events & Concert Venues Shopping Malls Gyms & Recreation Centers Salons & Spas Museums</p>
	Low Risk	High Risk



- **The old economy is gone. Re-opening is only a partial solution with unknown, unintended outcomes.**
- **Oil markets will adjust & prices will increase slowly once there is a path out of economic closure & a partial restoration of employment.**
- **Managing oil markets has failed & needs to be avoided in future.**
- **The world in depression will need oil more than ever. Less emphasis on renewable energy & climate change.**
- **Greatest near-term risks are crash of financial system from cascading defaults & collapse of developing world .**