Coronavirus Has Crushed Oil Prices

E+ Institute
March 27, 2020
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.
• 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**

| Source: EIA & Labyrinth Consulting Services, Inc. | AEO 2020 Primary Energy Consumption Forecast_aeotab_1-1.xlsx | Labyrinth Consulting Services, Inc. | artberman.com |
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
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.

Debt > GDP After 1986

Average price since 2014 is 44% higher than 1986-2004 avg
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

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

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

Supply Less Certain

Supply More Certain

Mid-Cycle Price
Marginal barrel or mmBtu price at the 5-year average needed to maintain supply

Market Clearing Price ($/barrel or mmBtu)

Comparative Inventory (C.I.)

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

![Graph showing oil price trends from 2014 to 2018 with peaks and troughs.](image-url)
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. is current crude + products stock level minus 5-yr avg

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<th>Date</th>
<th>Change</th>
<th>C.I.</th>
<th>WTI</th>
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<tr>
<td>3/20/20</td>
<td>-8.55</td>
<td>C.I.</td>
<td>$24.19</td>
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Source: EIA, HSNO & Labyrinth Consulting Services, Inc.
Brent price fall has flattened but 12-month spreads show a higher-frequency cyclicality. 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

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<tbody>
<tr>
<td>SUPPLY GROWTH</td>
<td>0.80</td>
<td>-1.95</td>
<td>-1.59</td>
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<td>DEMAND GROWTH</td>
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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.

C.I. = Comparative Inventory current stocks minus 5-yr avg

Source: EIA & Labyrinth Consulting Services, Inc.