



Art Berman

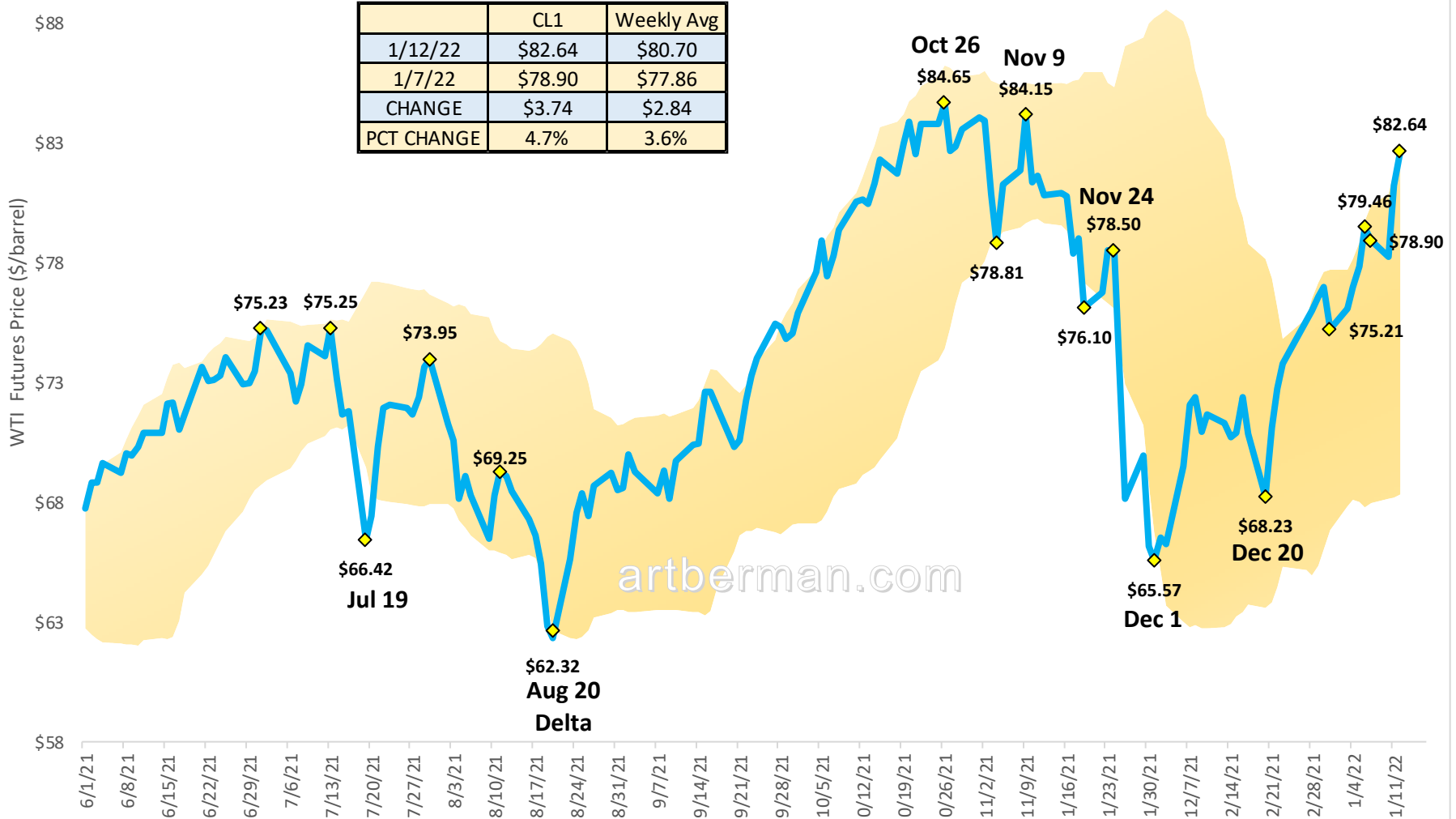
# Wealthion: Adam Taggart and Art Berman

January 17, 2022



**WTI futures price have increased +3.74 (+4.7%) to \$82.64 since last Friday January 7**  
**Price remains at upper Bollinger band limit**  
**Price is+\$14.41 (+21%) higher than Dec 20 but -\$2.01 (-2.4%) less than Oct 26**

	CL1	Weekly Avg
1/12/22	\$82.64	\$80.70
1/7/22	\$78.90	\$77.86
CHANGE	\$3.74	\$2.84
PCT CHANGE	4.7%	3.6%

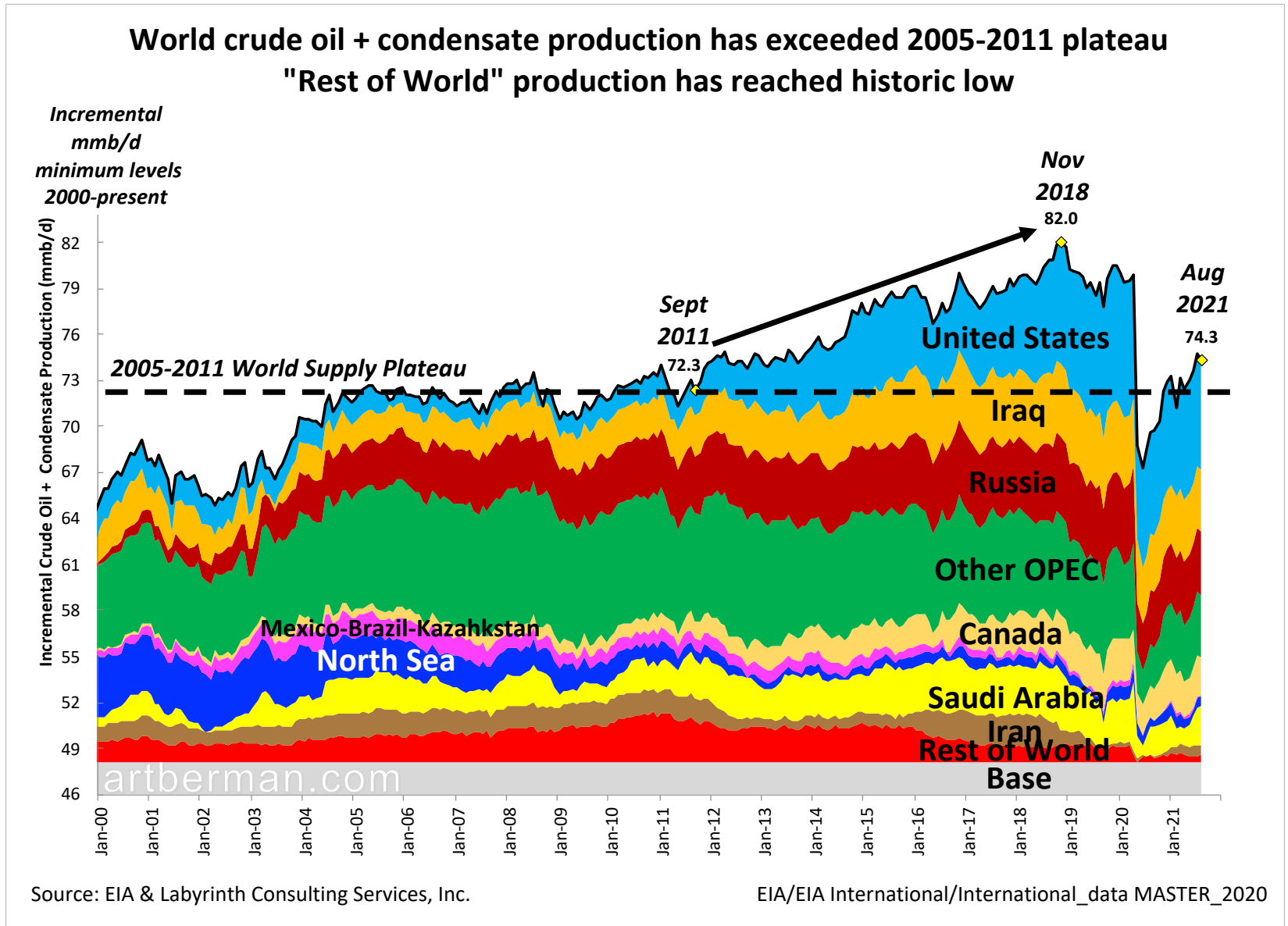


Source: MarketWatch, CME & Labyrinth Consulting Services, Inc.

Oil & Gas General/Futures & Future Spreads/CL FUTURES

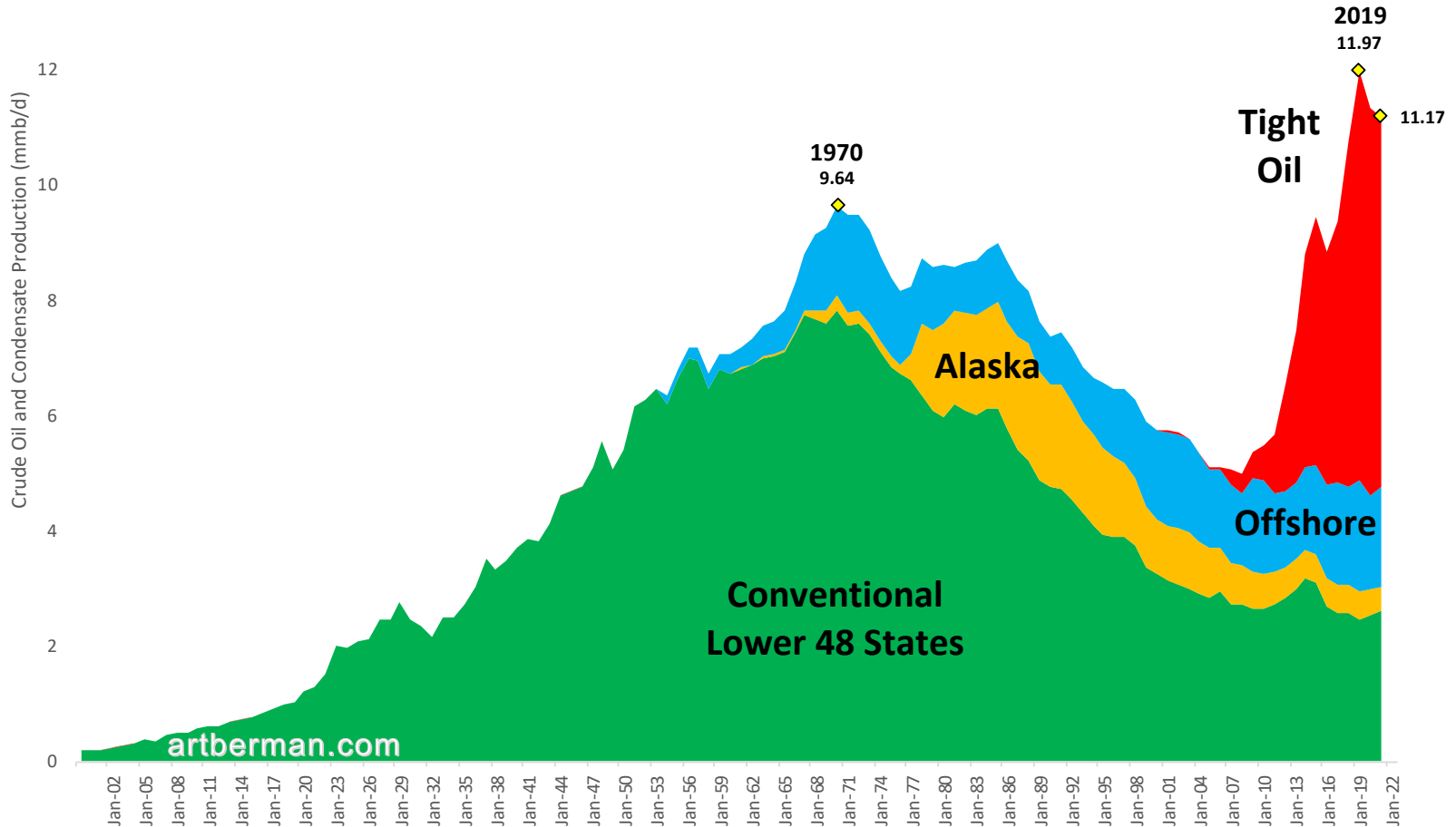
# Most of world oil production growth has been from the United States since about 2010

## since about 2010



# Impressive growth in U.S. oil production from 5 mmb/d in 2008 To 12 mmb/d in 2019

U.S. crude oil + condensate production peaked in 2019 at 12 mmb/d  
It has declined by 0.8 mmb/d (6.7%) to 11 mmb/d in 2021



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

EIA Current/Monthly Updates/Crude Oil Production Annual\_And\_Forecast

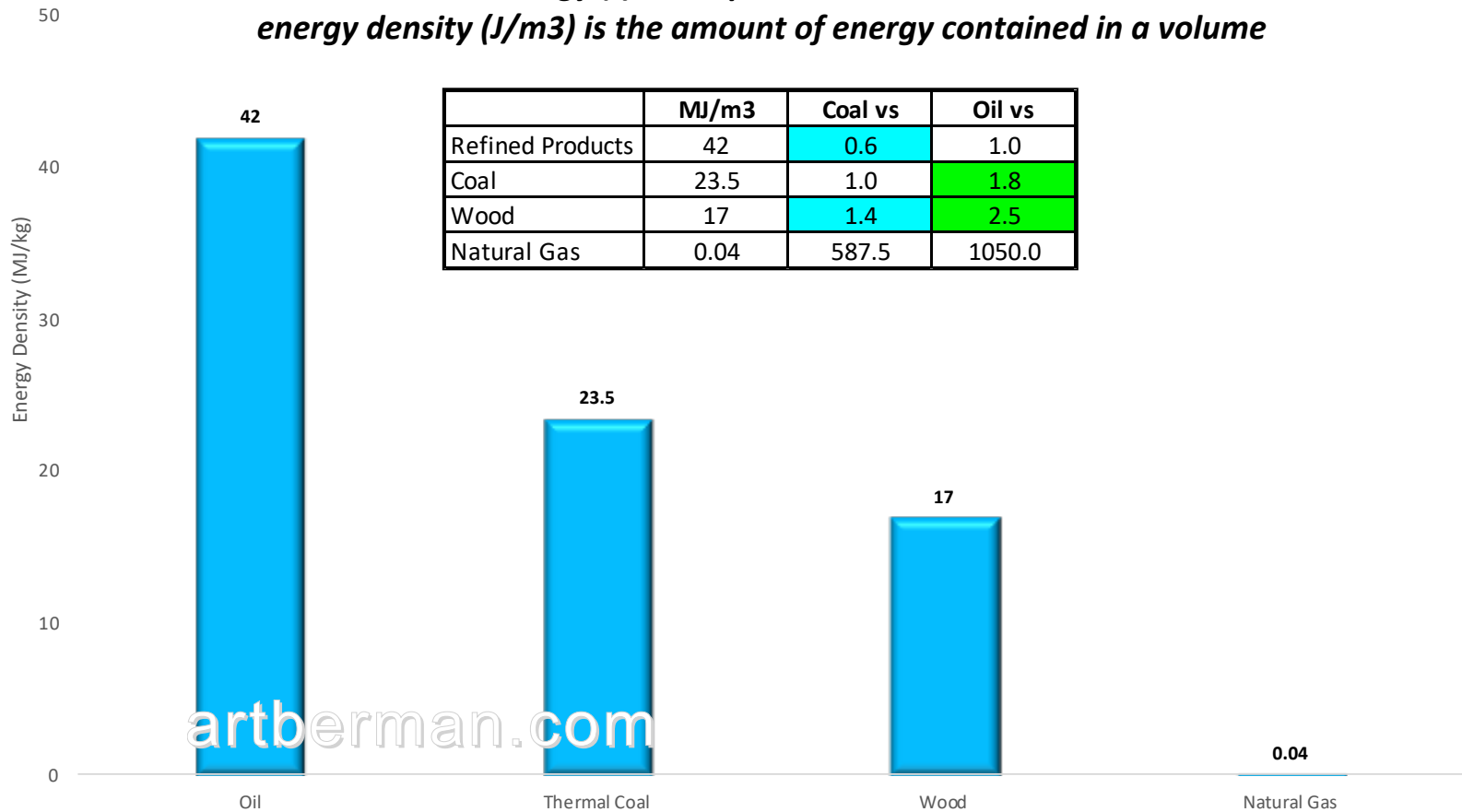
# Energy density: amount of energy contained in a volume

## Not all energy sources are equal

Energy density explains why we prefer coal over wood and oil over coal  
Coal has 1.4 times times as much energy as wood  
Oil has 1.8 times more energy than coal and 2.5 more energy than wood

*energy (J) is the potential to do work*

*energy density (J/m<sup>3</sup>) is the amount of energy contained in a volume*



Source: Layton (2008) & Labyrinth Consulting Services, Inc.

EIA/Energy Density/Energy Density Comparison

# Power density: how much energy can be converted to power from a volume

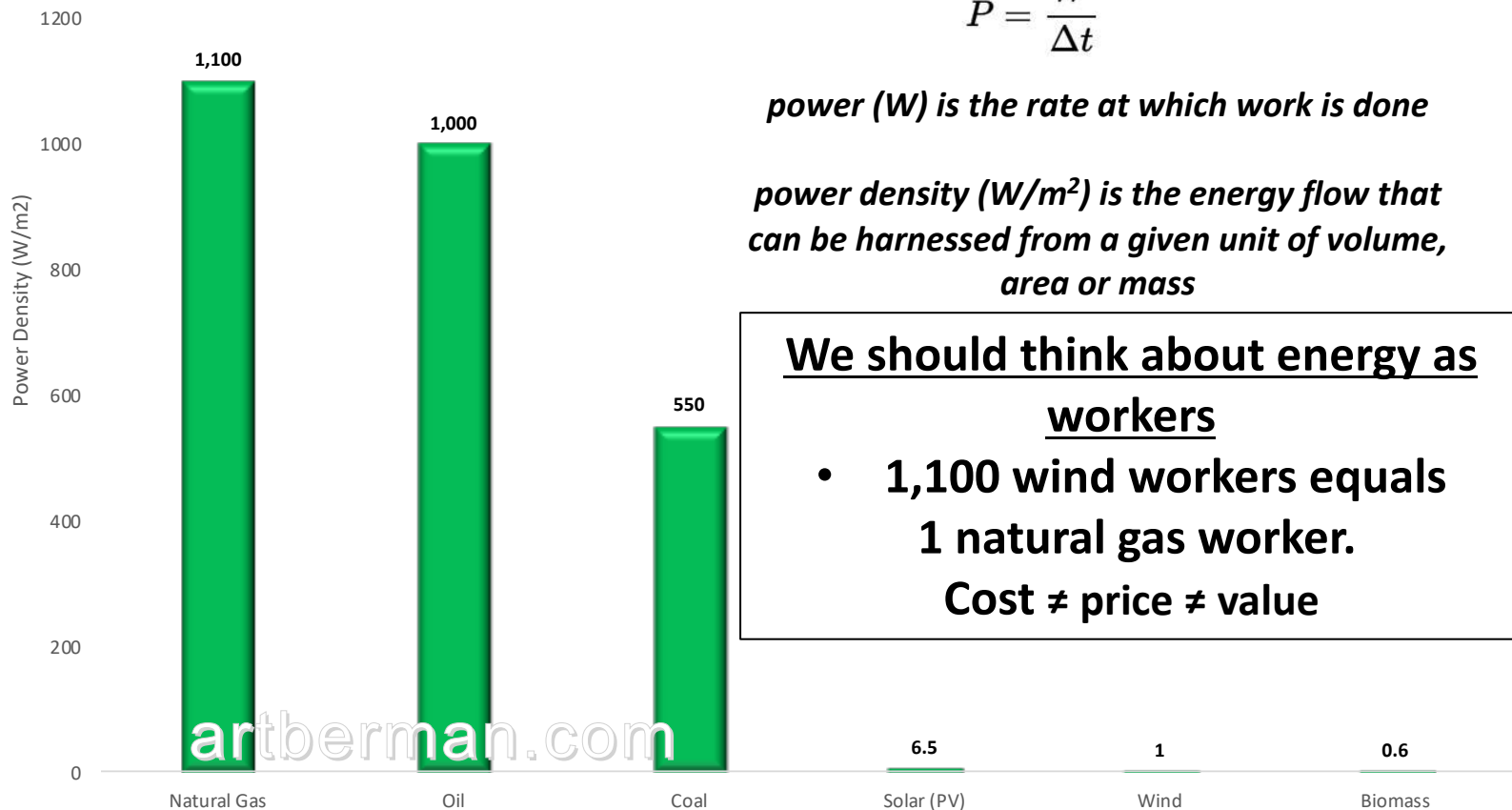
## Natural gas has 200 times more power density than solar and 1000 times more power density than wind

Solar PV has 0.6% the power density of natural gas and wind has 0.1%  
Solar requires 200 times larger source area to deliver the same power as gas  
Wind requires 1000 times larger source area to deliver the same power as gas

$$P = \frac{W}{\Delta t}$$

*power (W) is the rate at which work is done*

*power density (W/m<sup>2</sup>) is the energy flow that  
can be harnessed from a given unit of volume,  
area or mass*



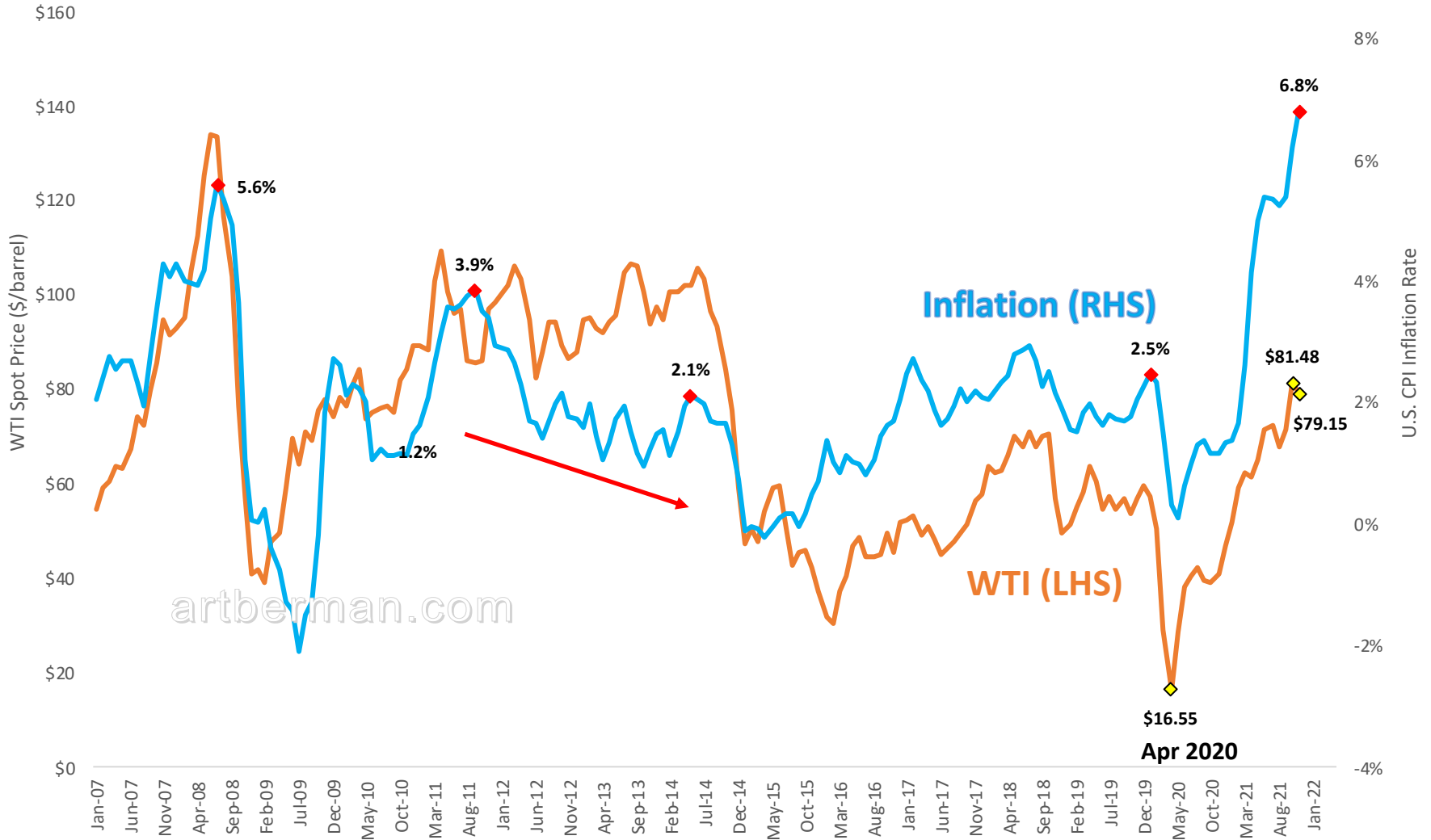
**We should think about energy as  
workers**

- **1,100 wind workers equals  
1 natural gas worker.  
Cost ≠ price ≠ value**

Source: Smil (2011), Layton (2008) & Labyrinth Consulting Services, Inc.

EIA/Energy Density/Energy Density Comparison

**Higher oil price is the leading cause of inflation**  
**November U.S. inflation rose from 6.2% to 6.8%**  
**WTI price decreased slightly from \$81.48 to \$79.15**

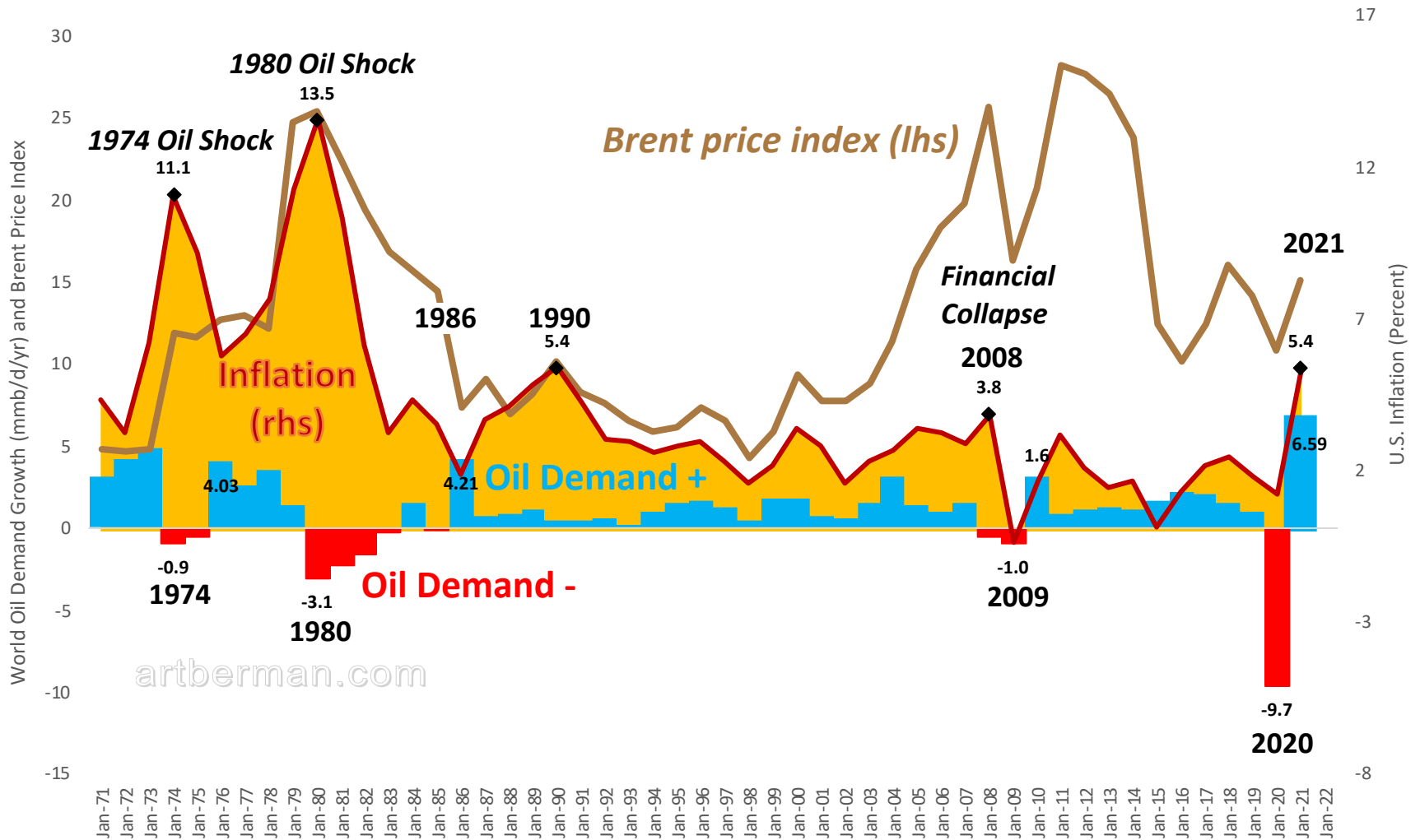


Source: OECD, EIA & Labyrinth Consulting Services, Inc

Oil & Gas General/CPI INFLATION OECD\_DP\_LIVE

# Factors causing oil demand destruction are poorly understood

## 2021 oil demand growth is highest ever and annual inflation rate is highest since 1990

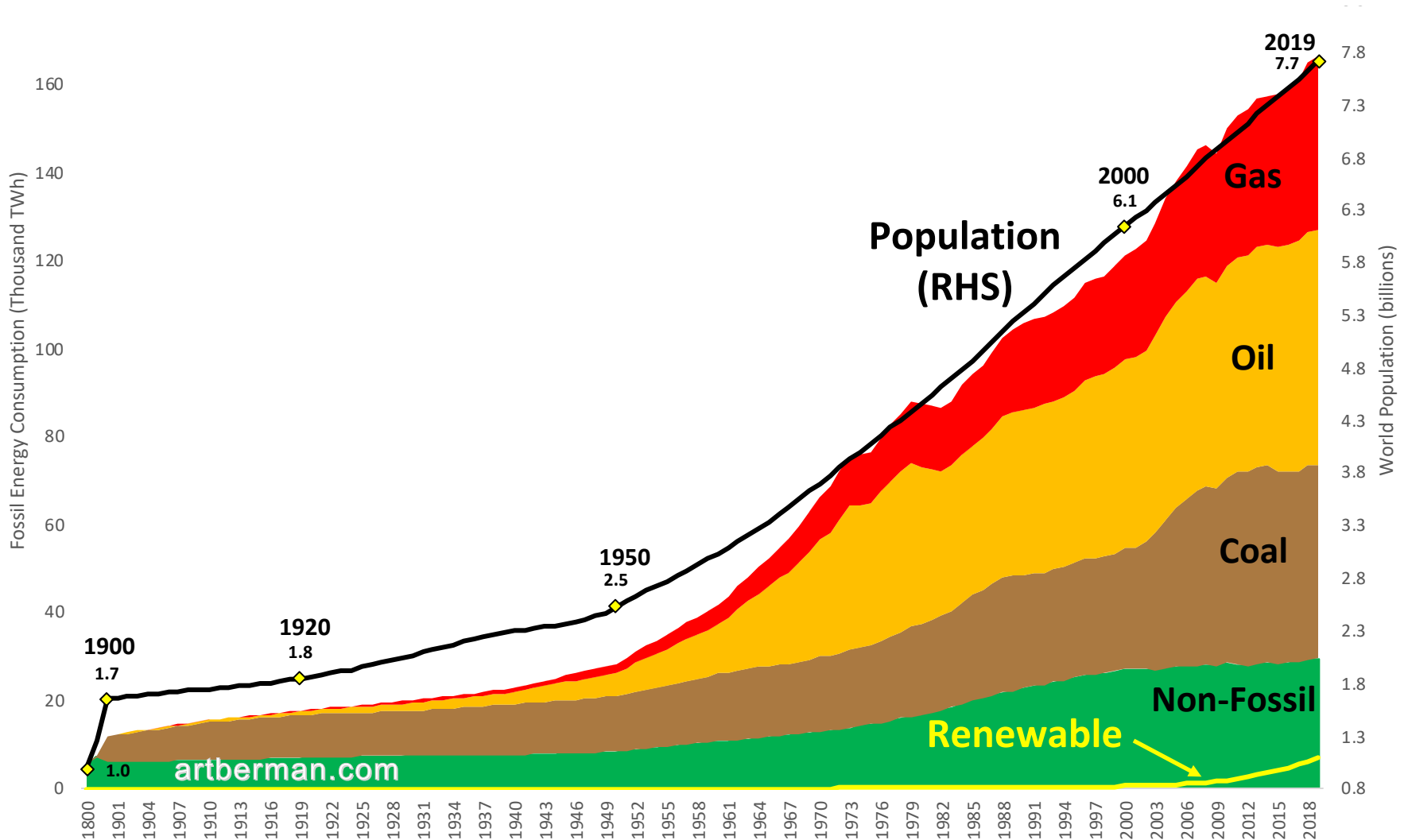


Source: IEA, OPEC, US Federal Reserve Bank, & Labyrinth Consulting Services, Inc

Oil & Gas General/Inflation Annual Master



# Non-fossil energy sources only capable of supporting population of ~2 billion today Tripling that capacity only supports ~6.0 of 9.8 billion projected 2050 population



Source: Our World in Data, UN & Labyrinth Consulting Services, Inc.

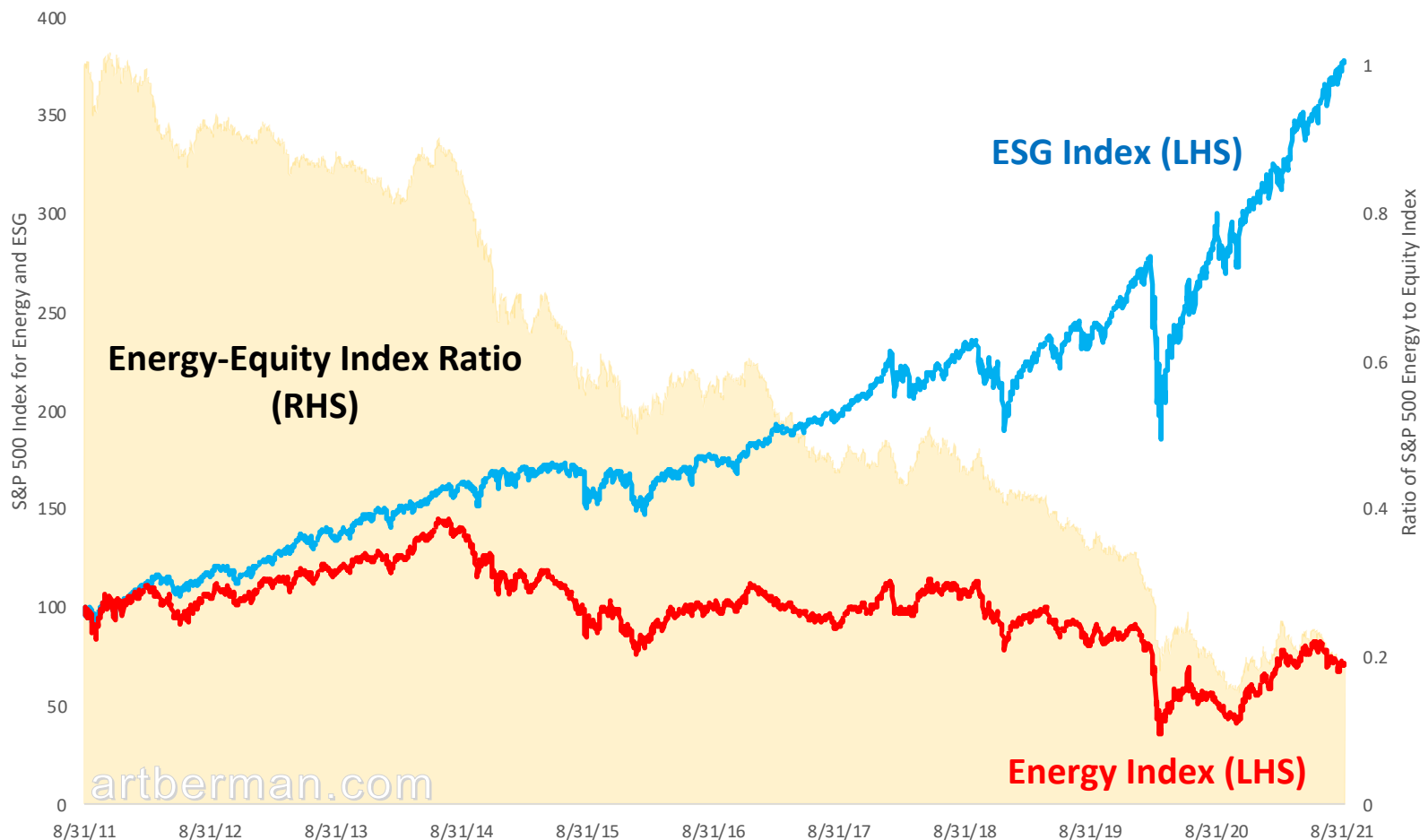
Labyrinth/Climate Change/World Population since 10000 BCE

# Investors and Credit Markets Are Shorting Energy

## Investors believe there are better returns outside of energy

**Energy sector performance has fallen by about 50% since 2014**  
**while ESG sector performance has increased 140%**

**ESG has out-performed equities by about 1.5% while energy has under-performed**



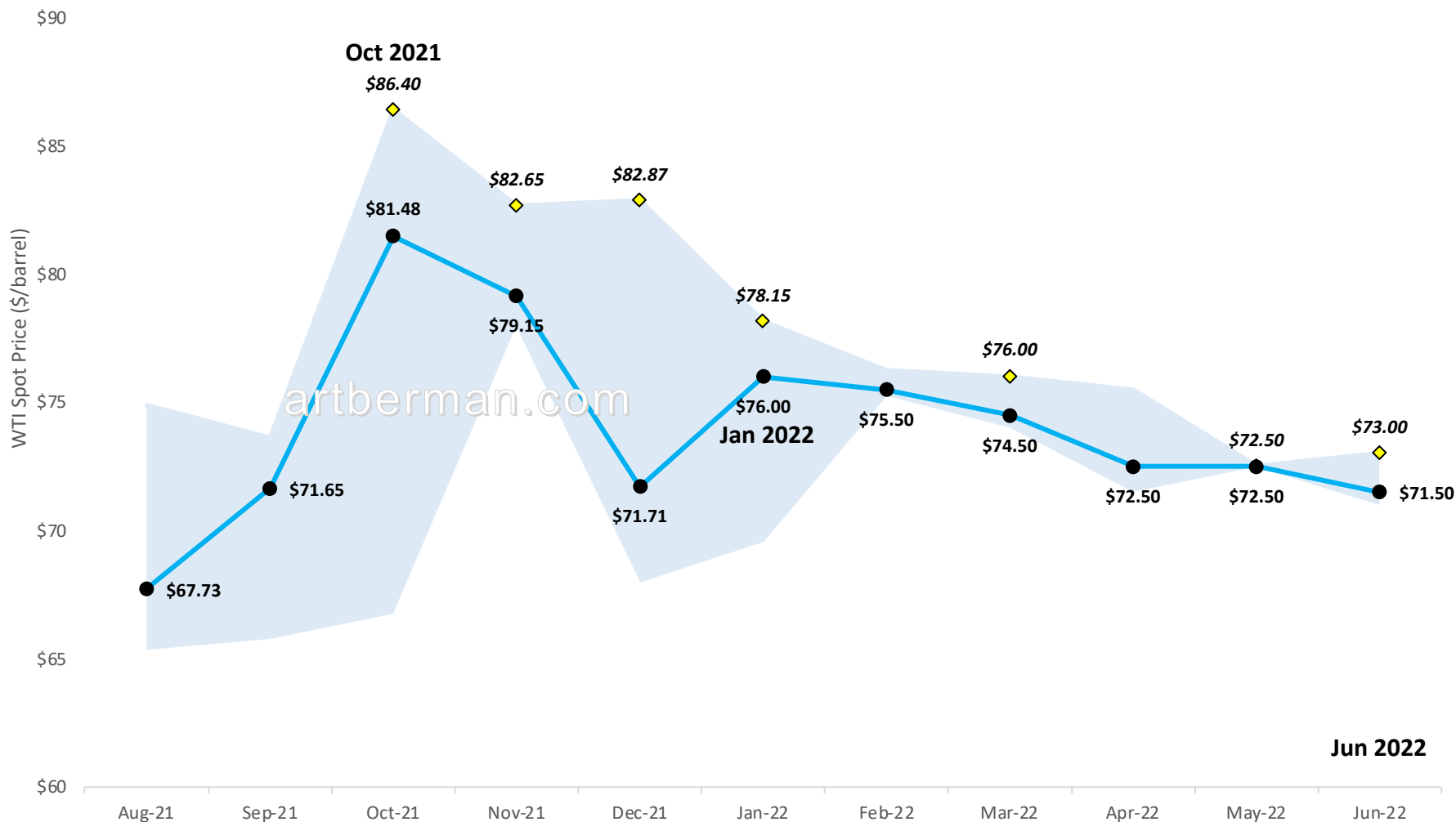
Source: S&P Dow Jones Indices & Labyrinth Consulting Services, Inc.

Oil and Gas General/S&P 500 Energy\_ESG\_Total S&P PerformanceComparison

# Shale companies have free cash flow for the first time in the history of tight oil plays



# EIA forecast suggests a maximum 2022 monthly average WTI price of \$76 in January with progressive decline to \$71.50 by December 2022



Source: EIA STEO & Labyrinth Consulting Services, Inc.

EIA Current/STEO/STEO Price Forecast