# L’ENERGIA IN ECONOMIA

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9 Marzo 2021

# WHO ARE THE TOP OIL PRODUCERS?

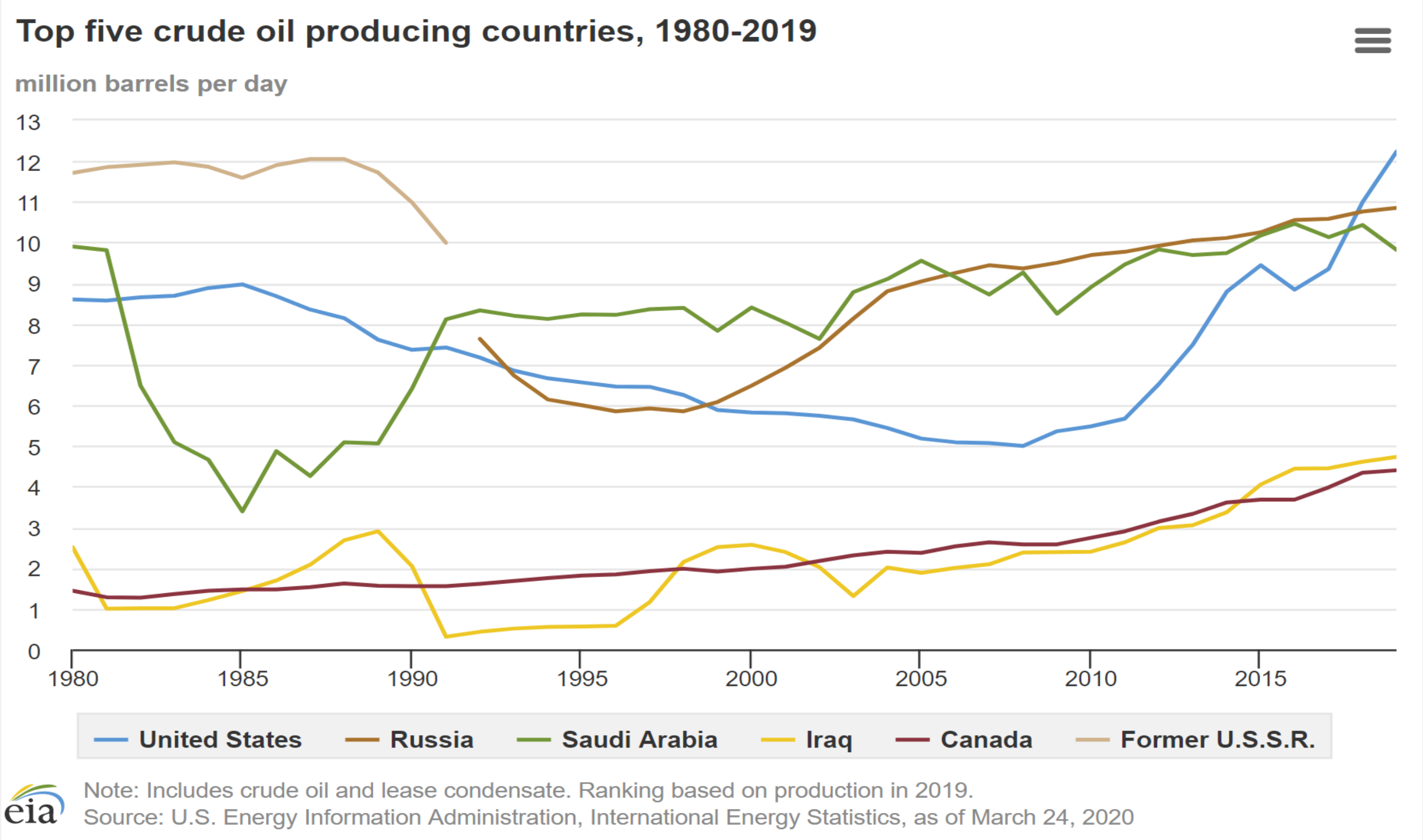
## Many countries produce crude oil

About 100 countries produce crude oil. However, in 2019, five countries accounted for about half of the world's total crude oil production.

**The top five crude oil producers and their percentage shares of world crude oil production in 2019 were**

| | | | | |
|---|---|---|---|---|
| 15% | 13% | 12% | 6% | 5% |
| United States | Russia | Saudi Arabia | Iraq | Canada |

# WHO ARE THE TOP OIL PRODUCERS?



# ENERGY PRODUCTS ARE COMMODITIES

- Commodities are homogenous goods, i.e. goods that are not differentiated
- Typical examples are:
  - Agricultural commodities: rice, corn, wheat…
  - Energy commodities: oil, natural gas…
  - Metals: gold, silver, copper…


BIRYANI
SORTEX

- Commodities have substantial fungibility: the market treats their instances as equivalent or nearly so with no regard to who produced them
- This implies that their price is set in **organized markets**, according to **global** supply and demand

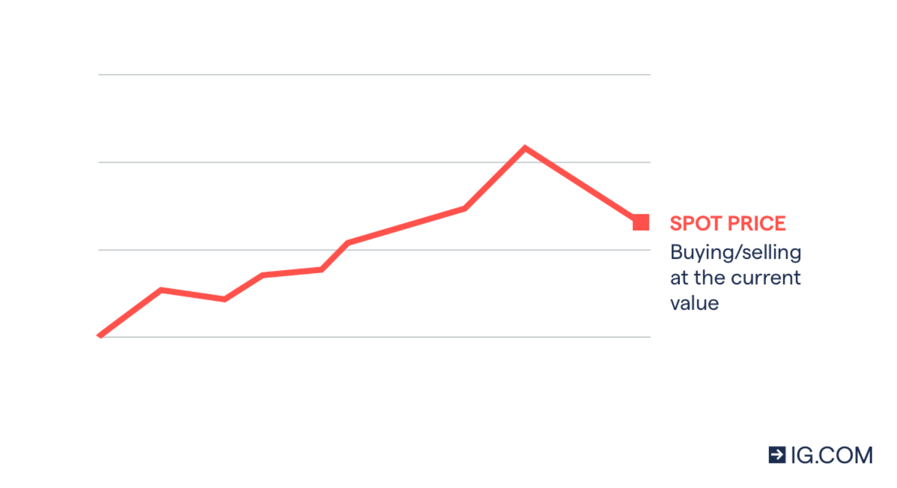
The main commodity markets are:

- NYMEX = New York Mercantile Exchange, is the commodity futures exchange where energy and metals are traded
- CBOT = Chicago Board of Trade, where agricultural commodities are traded

# WHAT IS THE DIFFERENCE BETWEEN FINANCIAL AND PHYSICAL MARKETS ?

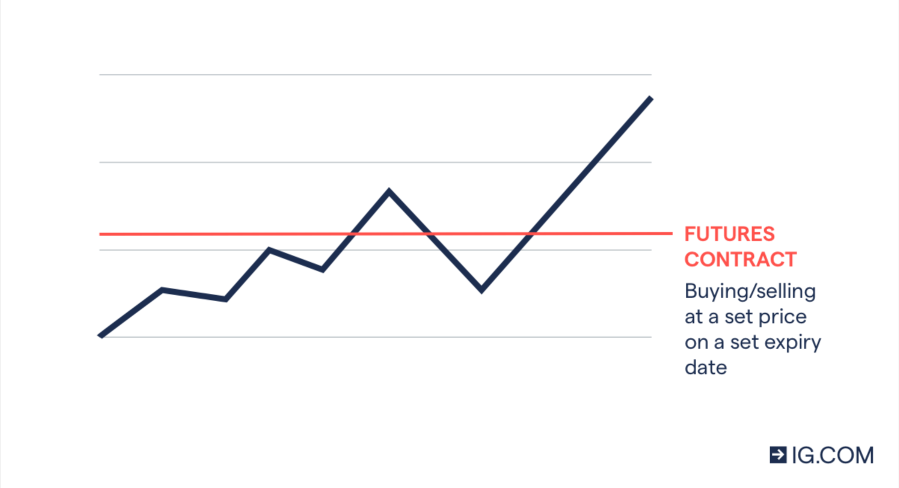
- In financial markets **no physical delivery** occurs.
  - This does not mean financial markets contain only investors and speculators!
  - We also have physical market participants which enter the financial market to hedge. Ex: Airline companies
- You can set prices that differ for an exchange that take place now (spot) or in the future (future)

# SPOT PRICE



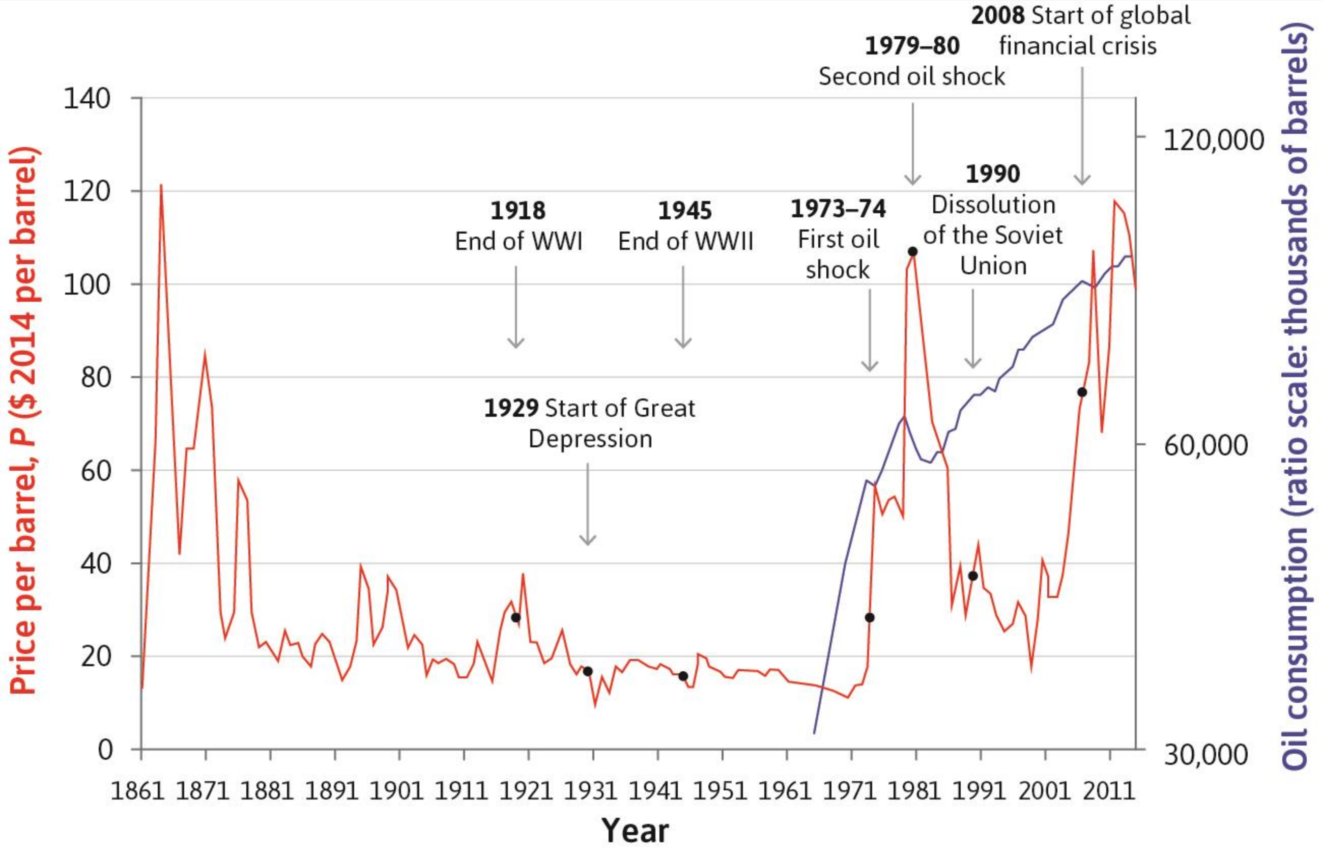

- Oil spot prices represent the cost of buying or selling oil immediately, or 'on the spot' – instead of at a set date in the future.
- While futures prices reflect how much the markets believe oil will be worth when the future expires, spot prices show how much it is worth right now.

# FUTURES PRICE




- Oil futures are contracts in which you agree to exchange an amount of oil at a set price on a set date. They're traded on exchanges and reflect the demand for different types of oil.
- Oil futures are a common method of buying and selling oil, and they enable you to trade rising and falling prices.

# MARKET DYNAMICS AT WORK: OIL PRICES




The figure plots the real price of oil in world markets (in constant 2014 US dollars) and the total quantity consumed globally from 1865 to 2014.

# MARKET DYNAMICS AT WORK: OIL PRICES

- Prices reflect scarcity: if a good becomes scarcer, or more costly to produce, the supply will fall and price will tend to rise.
- For more than 60 years, oil industry analysts have been predicting that demand would soon outstrip supply: production would reach a peak and prices would then rise as world reserves declined.
- But 'Peak oil' is not evident in the data!

# MARKET DYNAMICS AT WORK: THE MISSING PEAK PRICE

- One reason is that rising prices provide incentives for **further exploration**.
- Between 1981 and 2014, more than 1,000 billion barrels were extracted and consumed, yet world reserves of oil more than doubled from roughly 680 billion barrels to 1,700 billion barrels.

# MARKET DYNAMICS AT WORK: OIL PRICES

- The short-run fluctuations reflect short-run scarcity:

1. Demand is rigid in the short run because of the limited substitution possibilities (e.g., commuters).
2. Supply is rigid in the short run because
   - oil wells are expensive to drill, and their capacity is fixed
   - **OPEC**, a cartel with a dozen member countries, currently accounts for about 40% of world oil production

- This implies that a negative supply shock leads to a percentage increase in price much larger than the percentage decrease in quantity.

# WHO IS IN THE OPEC?

| OPEC members | Persian Gulf countries |
|---|---|
| Algeria | Bahrain |
| Angola | Iran |
| Congo | Iraq |
| Equatorial Guinea | Kuwait |
| Gabon | Qatar |
| **Iran** | Saudi Arabia |
| **Iraq** | United Arab Emirates |
| **Kuwait** | |
| Libya | |
| Nigeria | |
| **Saudi Arabia** | |
| **United Arab Emirates** | |
| Venezuela | |

- The Organization of the Petroleum Exporting Countries (OPEC) was organized in 1960 for the purpose of negotiating with oil companies on matters of oil production, prices, and future concession rights.
- Of the 13 OPEC member countries at beginning of 2020, only 5 of them were Persian Gulf countries.

# THE 1970S OIL PRICE SHOCKS

- In 1973 and 1974, OPEC countries imposed a partial oil embargo in response to the 1973–4 Middle East war
- In 1979 and 1980, oil production by Iran and Iraq fell because of the supply disruptions following the Iranian Revolution and the outbreak of the Iran–Iraq war.
- Total production and consumption fall, but because demand is very rigid, the percentage increase in price is much larger than the percentage decrease in quantity.
- The oil price (in 2014 US dollars) goes from $18 per barrel in 1973 to $56 in 1974, and then to $106 in 1980, but the declines in world oil consumption after these price shocks are small by comparison (–2% between 1973 and 1975, and –10% between 1979 and 1983).

# THE 2000–2008 OIL PRICE SHOCK

- A period of rapid economic growth in industrializing countries, especially China and India.
- This increase in income means an increase in oil demand
- In this case, it is the rigidity in the short-run supply that accounts for the big increase in price
- The sharp price decrease in 2009 has the same explanation but in reverse: the financial crisis of 2008–9 was a negative demand shock, so world consumption fell by about 3%, and the price of crude fell from over $100 per barrel in the summer of 2008 to $40–50 in early 2009.

# SHORT-RUN FLUCTUATIONS AND BUBBLES

- What makes the price messages hard to read is the **sharp swings** from high to low and back again over short periods of time.
- Price of commodities work as price of other financial assets, they reflect two orders of factors:
  - Current demand & supply scenario
  - Expectations on the future demand & supply scenario
- The term **bubble** refers to a sustained and significant departure of the price of any asset (financial or otherwise) from its fundamental value.
- Was the 2008 boom in commodity prices a bubble or not?

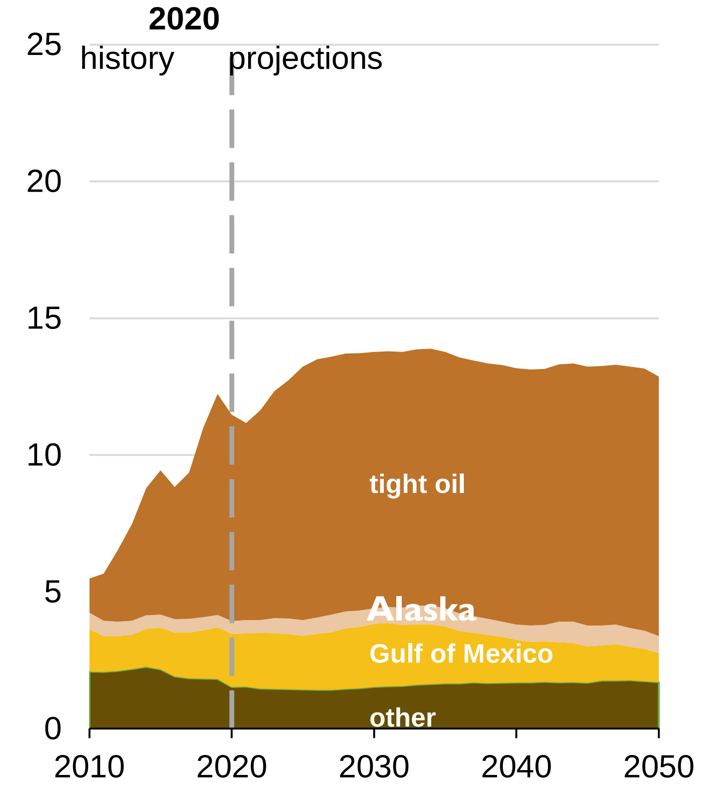
# HOW A NEW TECHNOLOGY CAN CHANGE THE EQUILIBRIUM

- An important development in the past 10 years has been the re-emergence of the US as a major oil producer via the ‘shale oil revolution’.
- **Shale oil** is extracted using the technology of hydraulic fracturing or ‘fracking’: injecting fluid into ground at high pressure to fracture the rock and allow extraction.

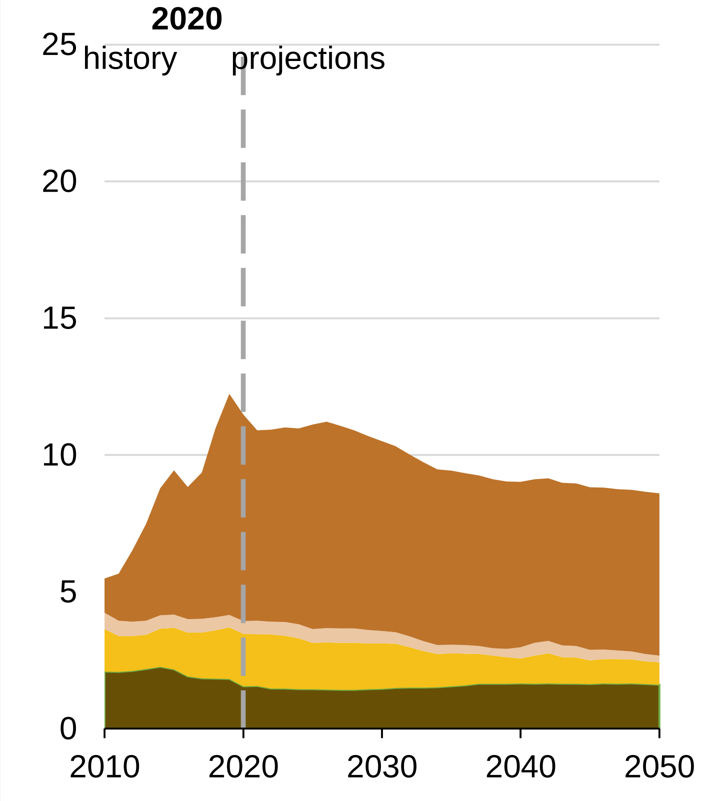
# U.S. CRUDE OIL PRODUCTION

**U.S. crude oil production, Annual Energy Outlook 2021 oil and gas supply cases**

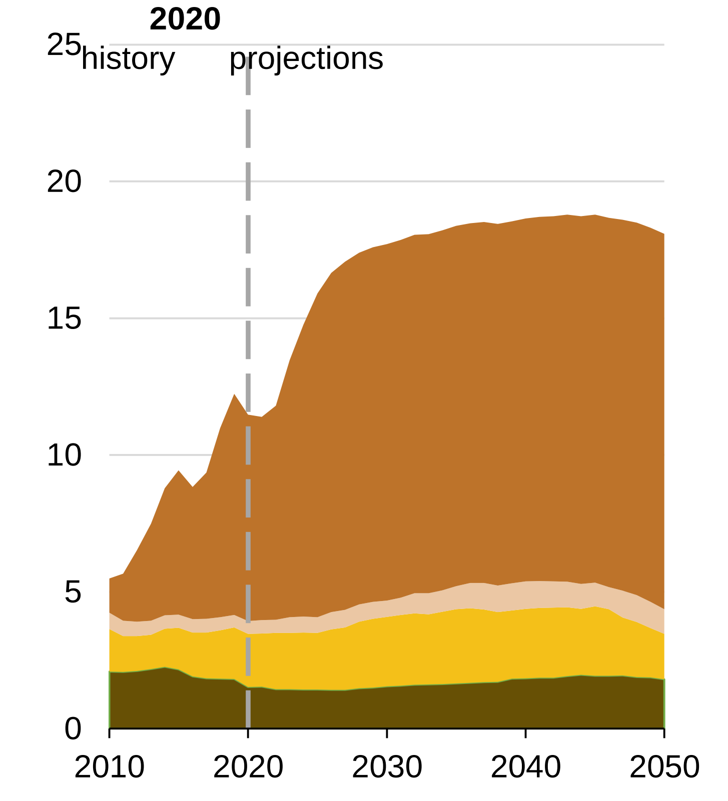
**Reference case**
million barrels per day




**Low Oil and Gas Supply case**
million barrels per day




**High Oil and Gas Supply case**
million barrels per day



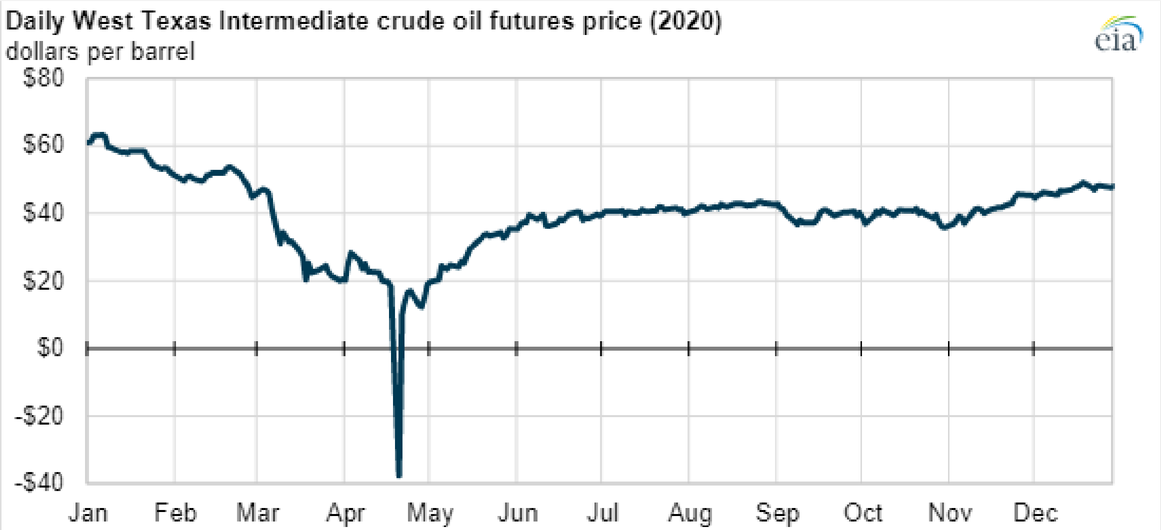
- The price of oil depends on the demand & supply scenario:

1. Macroeconomic outlook (Covid-19 dropped demand for oil)
2. Geopolitical frictions (70s oil crises)
3. Technological developments (fracking)

# THE PRICE OF OIL IN 2020

- Worldwide demand for oil fell rapidly as governments closed businesses and restricted travel.
- March:  an oil price war between Russia and Saudi Arabia erupted when the two nations failed to reach a consensus on oil production levels.
- April: an oversupply of oil led to an unprecedented collapse in oil prices, forcing the contract futures price for WTI to plummet from $18 a barrel to -$37 a barrel.
- By the summer, oil prices began to rebound as nations emerged from lockdown and OPEC agreed to significant cuts in crude oil production.
- By year's end, optimism over the possible rollout of multiple COVID-19 vaccines buoyed the market

# THE PRICE OF OIL IN 2020




- As petroleum demand fell and U.S. crude oil inventories increased, West Texas Intermediate (WTI) crude oil traded at negative prices on April 20, the first time the price for the WTI **futures** contract fell to less than zero since trading began in 1983.

# WHAT'S NEXT?

- Prices have risen strongly in the twenty-first century and an increasing number of analysts are predicting that conventional oil, at least, has reached a peak.
- … But unconventional resources such as shale oil are now being exploited.
- Perhaps it will be climate change policies, rather than resource depletion, that eventually curb oil consumption.


1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

# THANK YOU!