ECONOMIC & ENVIRONMENTAL COSTS OF ELECTRIC & FLEX-FUEL VEHICLES

Antonio Chaves, Montgomery College

Mass/Energy ratio & expense of EV batteries:

1. Open https://www.lithiumion-batteries.com/products/lithium-ion-solar-batteries/12v-200ah-lithium-ion-battery.php to look up amp-hours, mass, and costs of 12-volt lithium batteries.
2. Open https://www.grainger.com/category/electronics-batteries/batteries-battery-chargers/sealed-lead-acid-batteries-chargers to look up amp-hours, mass, and costs of 12-volt lithium batteries.
3. Enter these values in the corresponding cells in **Tables 1 and 4** and follow the instructions for calculating watt-hours, kilowatt hours, and lbs per kilowatt hour.

Driving range per kWh of a compact EV:

Open https://www.fueleconomy.gov/feg/PowerSearch.do?action=noform&srchtyp=ymm&path=1&year1=2014&year2=2018&make=Honda&model=Fit and look up kilowatt hours per 100 miles of the electric Honda Fit and enter this value in **Table 2**.

Land needed for switchgrass ethanol:

1. Open https://www.eia.gov/tools/faqs/faq.php?id=23&t=10 to look up barrels of gasoline used per day in US, then enter this in your excel spreadsheet and **Table 5**.
2. Open https://state.1keydata.com/states-by-size.php to look up state sizes and compare this to your calculated value in Table 5.

Switchgrass for EV versus flex-fuel vehicles:

1. Open https://www.renewableenergyworld.com/baseload/bioenergy/switchgrass-burn-test-proves-hopeful-45188/ and use the information to calculate the kWh of electricity generated per ton of switchgrass, then enter this into **Table 6.**
2. Open Fuel Economy of 2018 Honda Fit to look up mpg of the Honda Fit then enter this into your excel spreadsheet and **Table 7**.
3. Calculate and compare miles per 100 lbs switchgrass for electric and ethanol vehicles **Tables 6 and 7**.

Fossil fuel expenditures for EV's:

1. Open https://www.eia.gov/totalenergy/data/monthly/pdf/sec7_5.pdf to look up total electricity generated from coal, petroleum, and gas during a given year then enter this into your excel spreadsheet and **Table 8**.
2. Open https://www.eia.gov/totalenergy/data/monthly/pdf/sec7_9.pdf to look up total coal, petroleum, and gas consumed during the same year then enter this into your excel spreadsheet and **Table 8**.

The impact of US consumption on the world price of petroleum:

1. Enter the millions of barrels consumed by the US per day into your excel spreadsheet to estimate barrels added to the market in **Table 10**. https://www.eia.gov/tools/faqs/faq.php?id=33&t=6

Millions of barrels consumed by US per day	% increase in US consumption	Millions of barrels more consumed by the US per day	Current price per barrel ($)	New price per barrel ($) (6)
	10.00	0.00		0.00

2. Enter the current price per barrel to estimate how price is affected by the surplus.

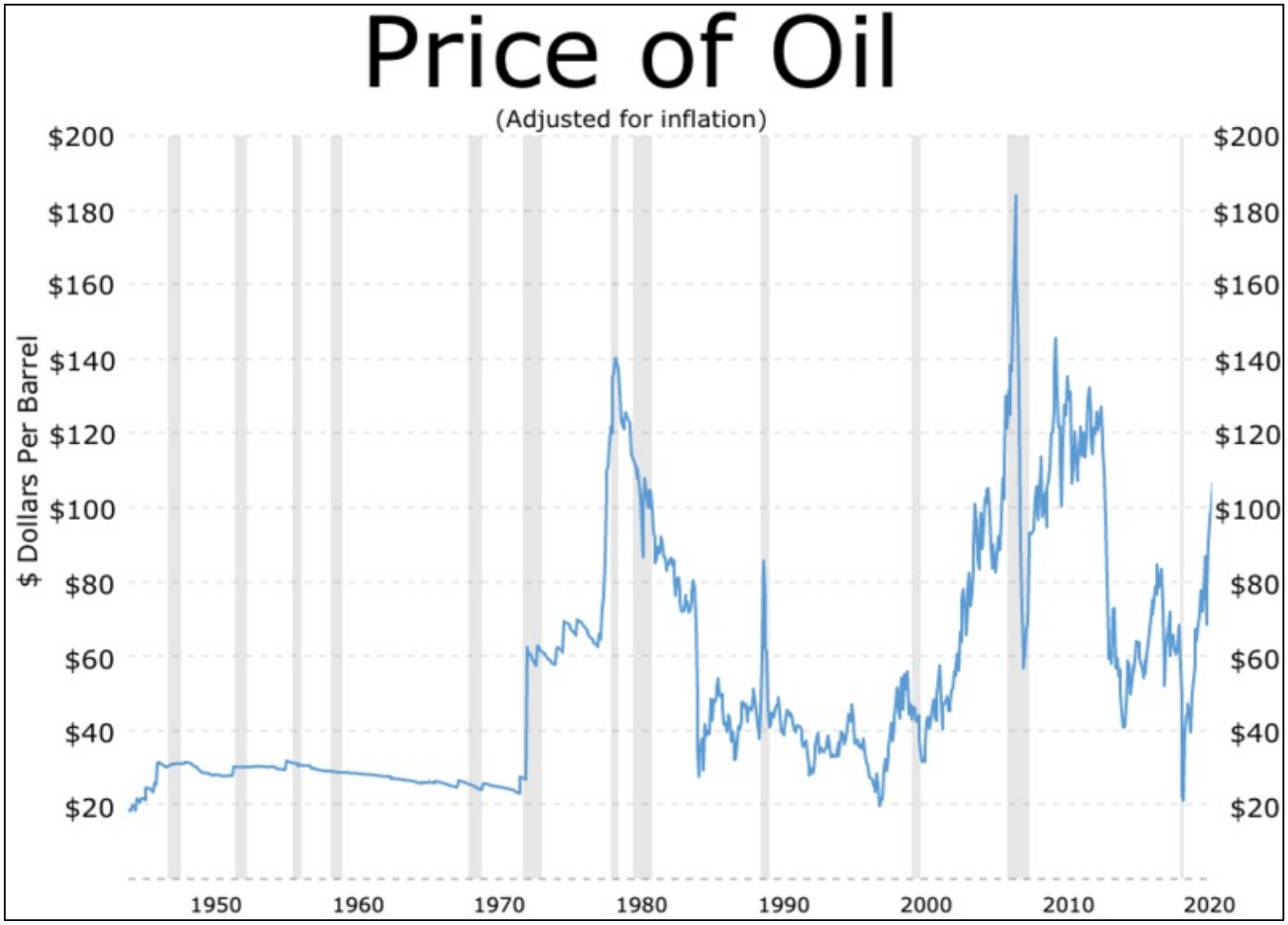
Millions of barrels consumed by US per day	% increase in US consumption	Millions of barrels more consumed by the US per day	Current price per barrel ($)	New price per barrel ($) (6)
	10.00	0.00		0.00

The economic impact of fuel taxes:

Enter the tax per barrel into your excel spreadsheet to estimate the percent reduction in GDP in **Table 11**.

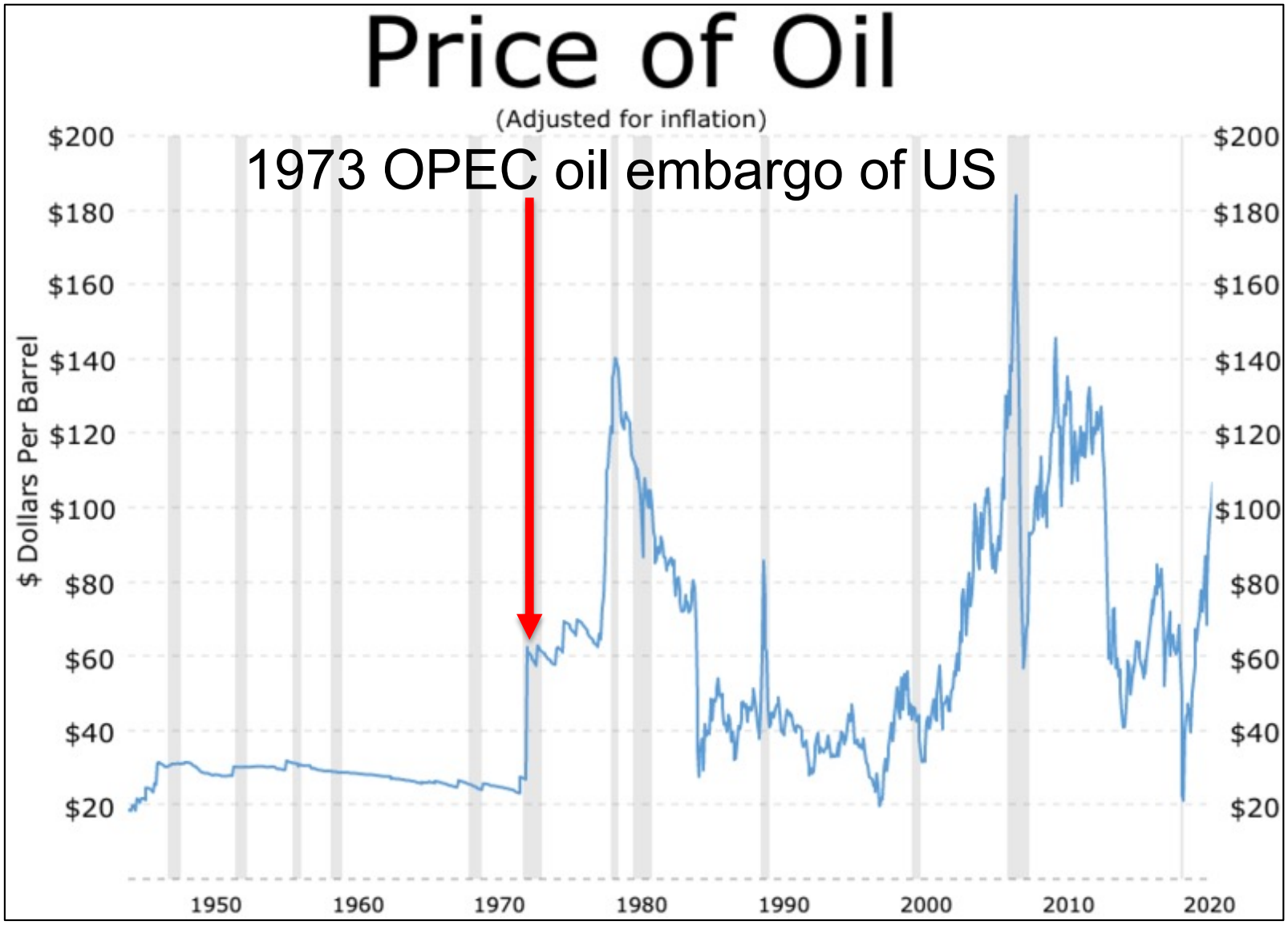
Tax per barrel ($)	% reduction in GDP
	0.00

Law of supply and demand sets oil prices:



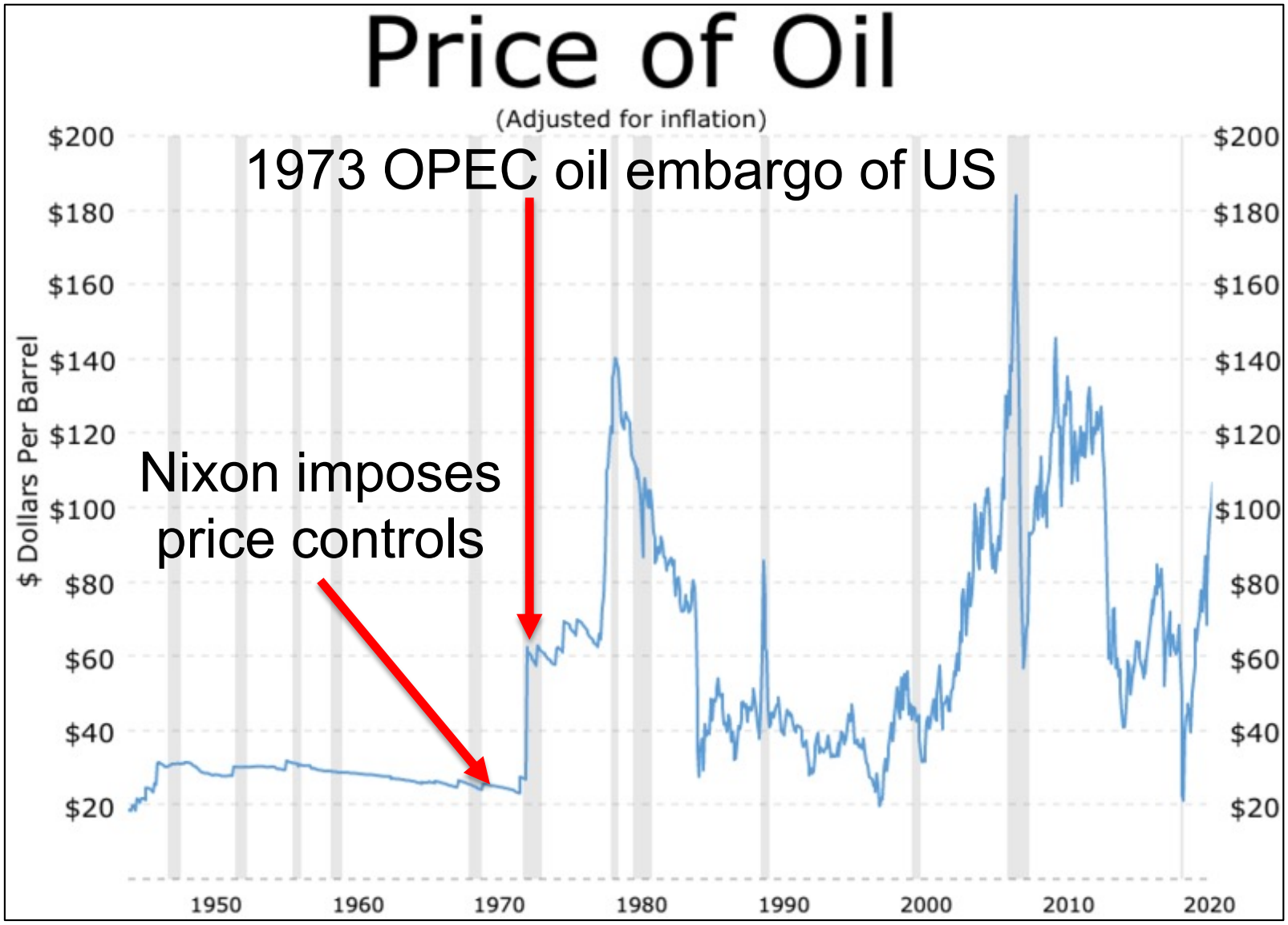
Crude Prices: 70 Year Historical Chart Source: Macrotrends
https://www.macrotrends.net/1369/crude-oil-price-history-chart

Law of supply and demand sets oil prices:



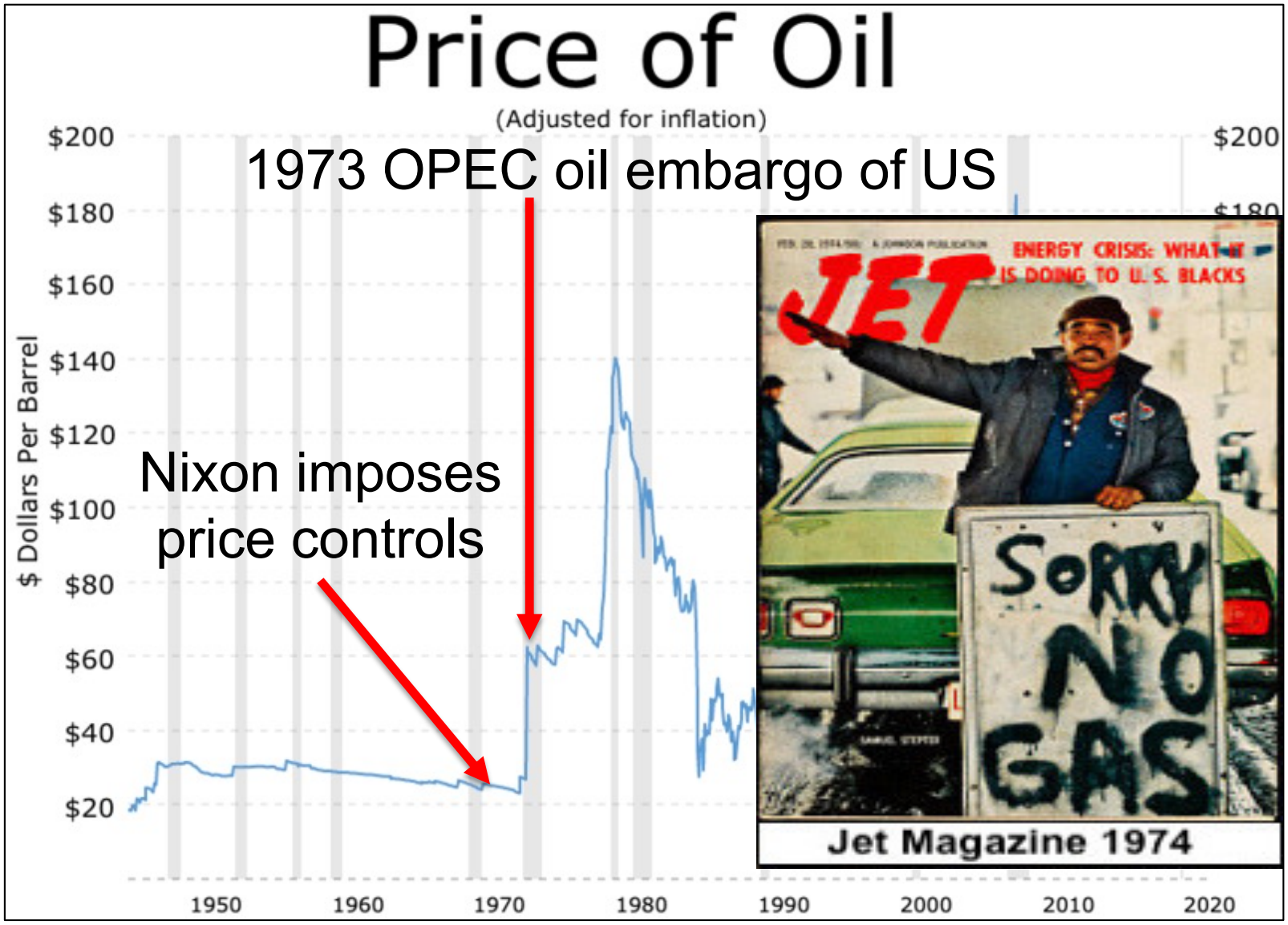
Crude Prices: 70 Year Historical Chart Source: Macrotrends
https://www.macrotrends.net/1369/crude-oil-price-history-chart

Law of supply and demand sets oil prices:

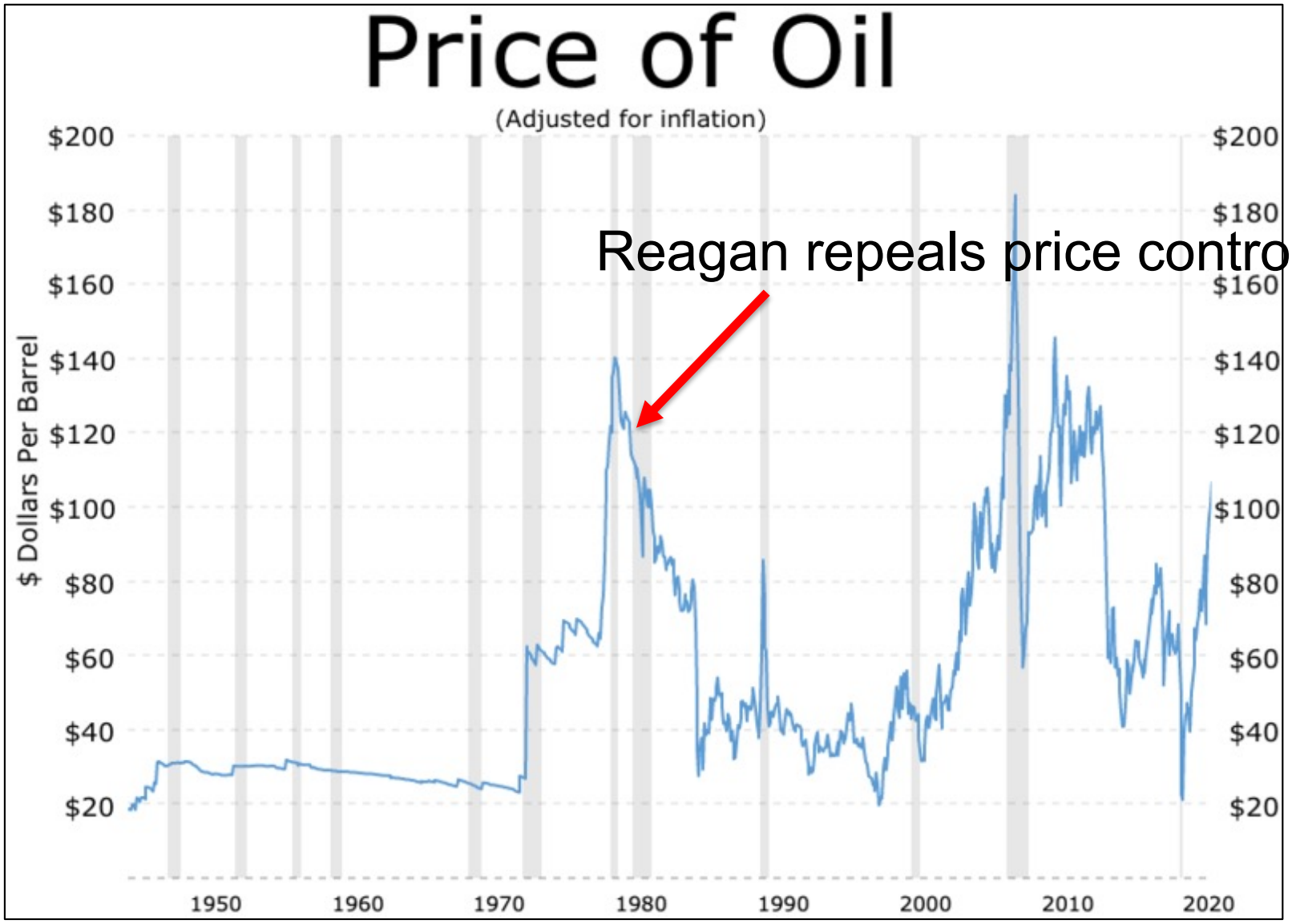


Crude Prices: 70 Year Historical Chart Source: Macrotrends
https://www.macrotrends.net/1369/crude-oil-price-history-chart

Law of supply and demand sets oil prices:

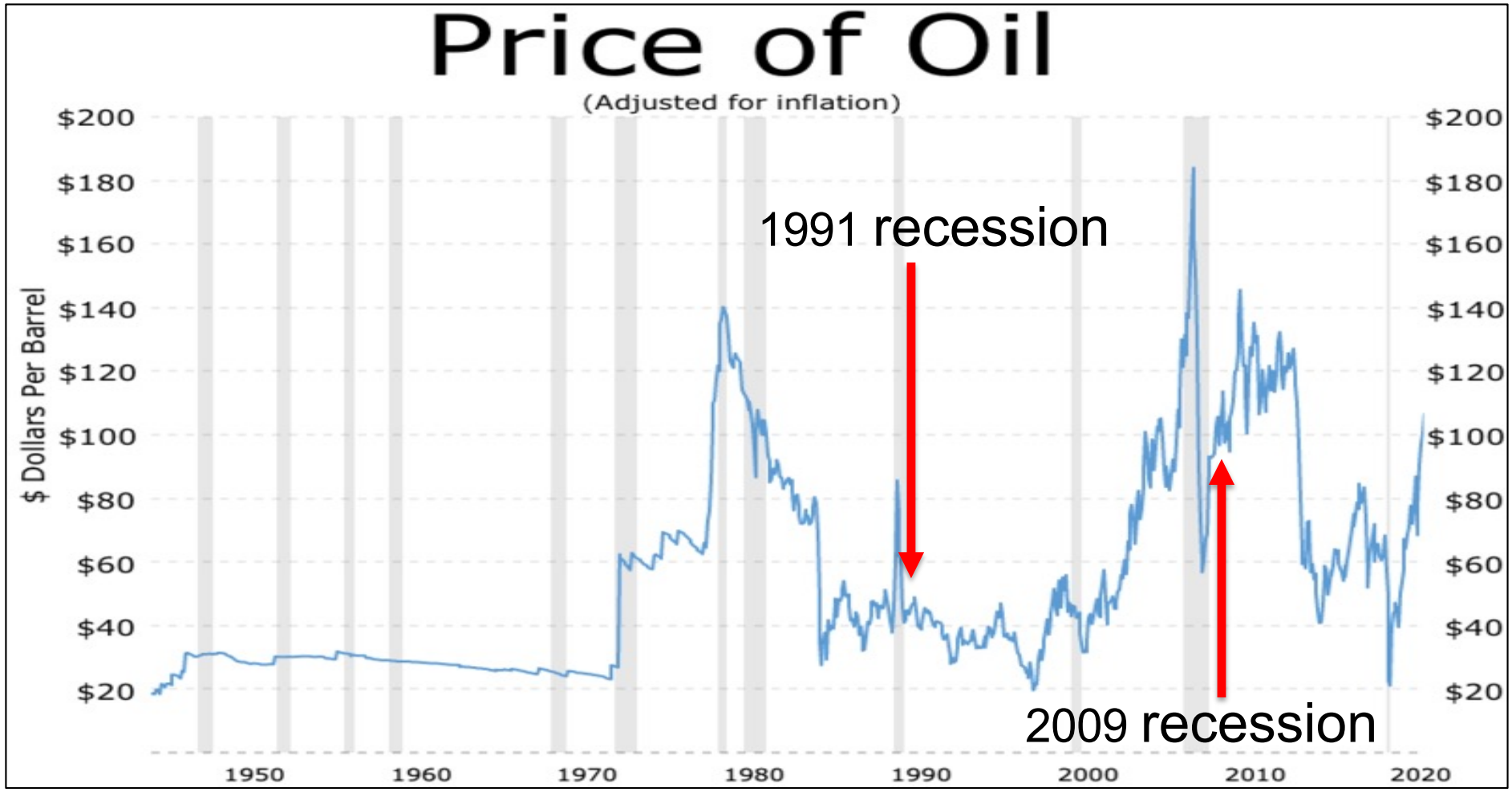


Crude Prices: 70 Year Historical Chart Source: Macrotrends
https://www.macrotrends.net/1369/crude-oil-price-history-chart



Crude Prices: 70 Year Historical Chart Source: Macrotrends
https://www.macrotrends.net/1369/crude-oil-price-history-chart

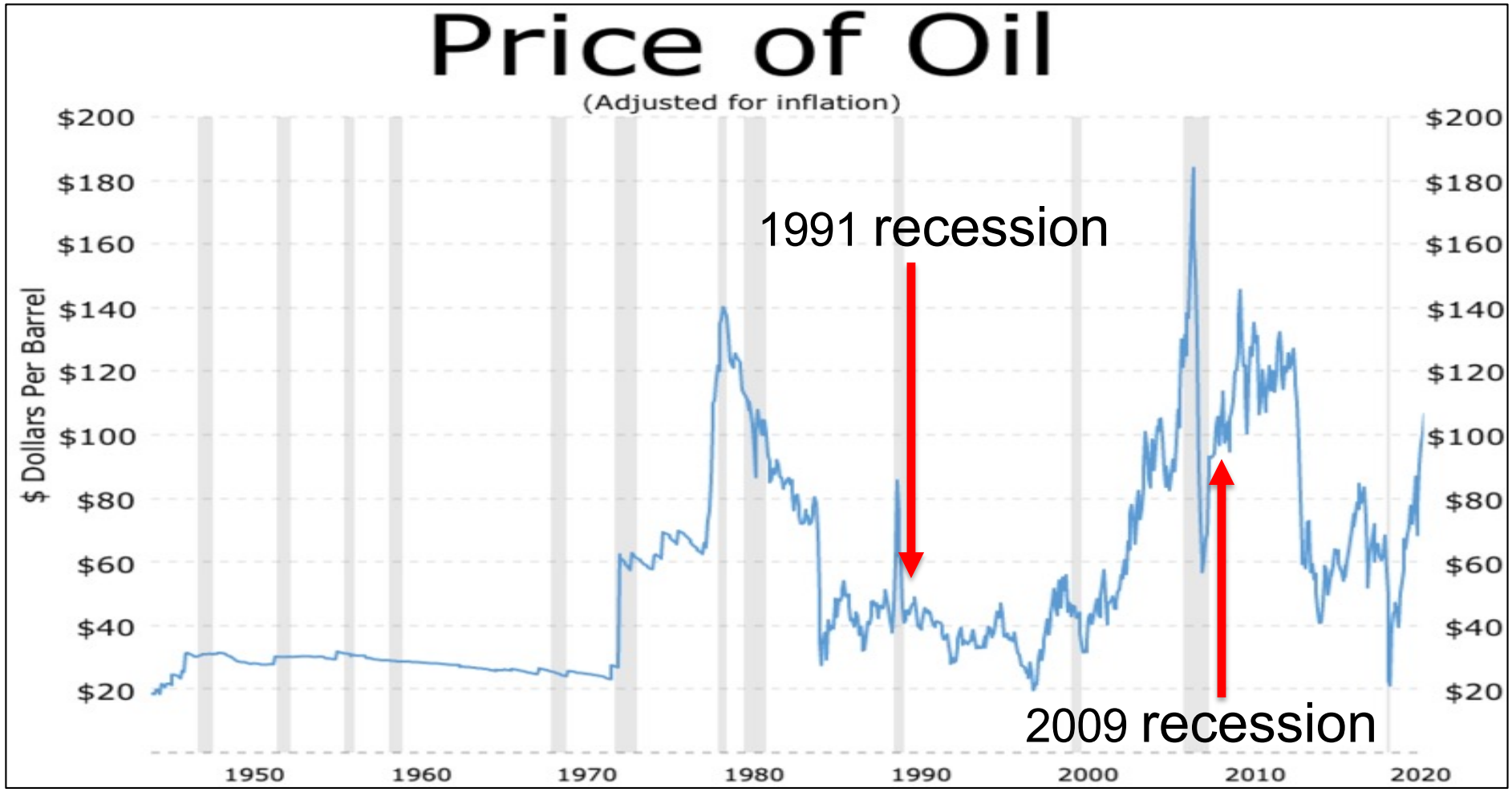
High oil prices have wide-ranging consequences…



Do high oil prices cause recessions? Source: Economics Help (3/14/22) https://www.economicshelp.org/blog/167932/economics/do-rising-oil-prices-cause-recession/

High oil prices have wide-ranging consequences…

…so punitive taxes on oil are not a good solution!



Do high oil prices cause recessions? Source: Economics Help (3/14/22)
https://www.economicshelp.org/blog/167932/economics/do-rising-oil-prices-cause-recession/

Underreported facts about fossil fuel subsidies:

The Surprising Reason That Oil Subsidies Persist, Forbes (4/25/2012)
https://www.forbes.com/sites/energysource/2012/04/25/the-surprising-reason-that-oil-subsidies-persist-even-liberals-love-them/?sh=2ebaf5653279

Underreported facts about fossil fuel subsidies:

- The largest expenditure is for the Strategic Petroleum Reserve

The Surprising Reason That Oil Subsidies Persist, Forbes (4/25/2012)
https://www.forbes.com/sites/energysource/2012/04/25/the-surprising-reason-that-oil-subsidies-persist-even-liberals-love-them/?sh=2ebaf5653279

Underreported facts about fossil fuel subsidies:

- The largest expenditure is for the Strategic Petroleum Reserve

- The second largest expenditure is tax exemptions for farm fuel.

The Surprising Reason That Oil Subsidies Persist, Forbes (4/25/2012)
https://www.forbes.com/sites/energysource/2012/04/25/the-surprising-reason-that-oil-subsidies-persist-even-liberals-love-them/?sh=2ebaf5653279

Underreported facts about fossil fuel subsidies:

- The largest expenditure is for the Strategic Petroleum Reserve
- The second largest expenditure is tax exemptions for farm fuel.
- The third largest expenditure is Low-Income Energy Assistance.

The Surprising Reason That Oil Subsidies Persist, Forbes (4/25/2012)
https://www.forbes.com/sites/energysource/2012/04/25/the-surprising-reason-that-oil-subsidies-persist-even-liberals-love-them/?sh=2ebaf5653279

Underreported facts about fossil fuel subsidies:

- The largest expenditure is for the Strategic Petroleum Reserve
- The second largest expenditure is tax exemptions for farm fuel.
- The third largest expenditure is Low-Income Energy Assistance.
- Additional subsidies help keep more oil and gas jobs in the US

The Surprising Reason That Oil Subsidies Persist, Forbes (4/25/2012)
https://www.forbes.com/sites/energysource/2012/04/25/the-surprising-reason-that-oil-subsidies-persist-even-liberals-love-them/?sh=2ebaf5653279

What about electric vehicles?

What about electric vehicles? Lithium is not green!

Protests force government to pull three areas identified for lithium mining. Source: Portugal Resident (2/17/20) https://www.portugalresident.com/protests-force-government-to-pull-two-areas-identified-for-lithium-mining/

Electric car in Florida catches fire after being flooded during Hurricane Idalia, firefighters say. Source: FOX Weather (8/31/23)
https://www.foxweather.com/weather-news/tesla-electric-car-fire-precautions