

ENERGY AND CLIMATE: WHO CAN WE TRUST

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LifePowered.org



TXNG.ORG



FACTS: WHO DO YOU TRUST??



The Media?



Scientists?



Washington D.C.?



Vegas Odds Makers?



CLIMATE CHANGE



Who Should We Trust??

CLIMATE CHANGE INFORMATION?



U.N.?



Paris Accord?



Media?



Congress?

How Long Do We Have??

10 years?

12 years?

30 years?

50 years?

1000 years?



Billionaires?



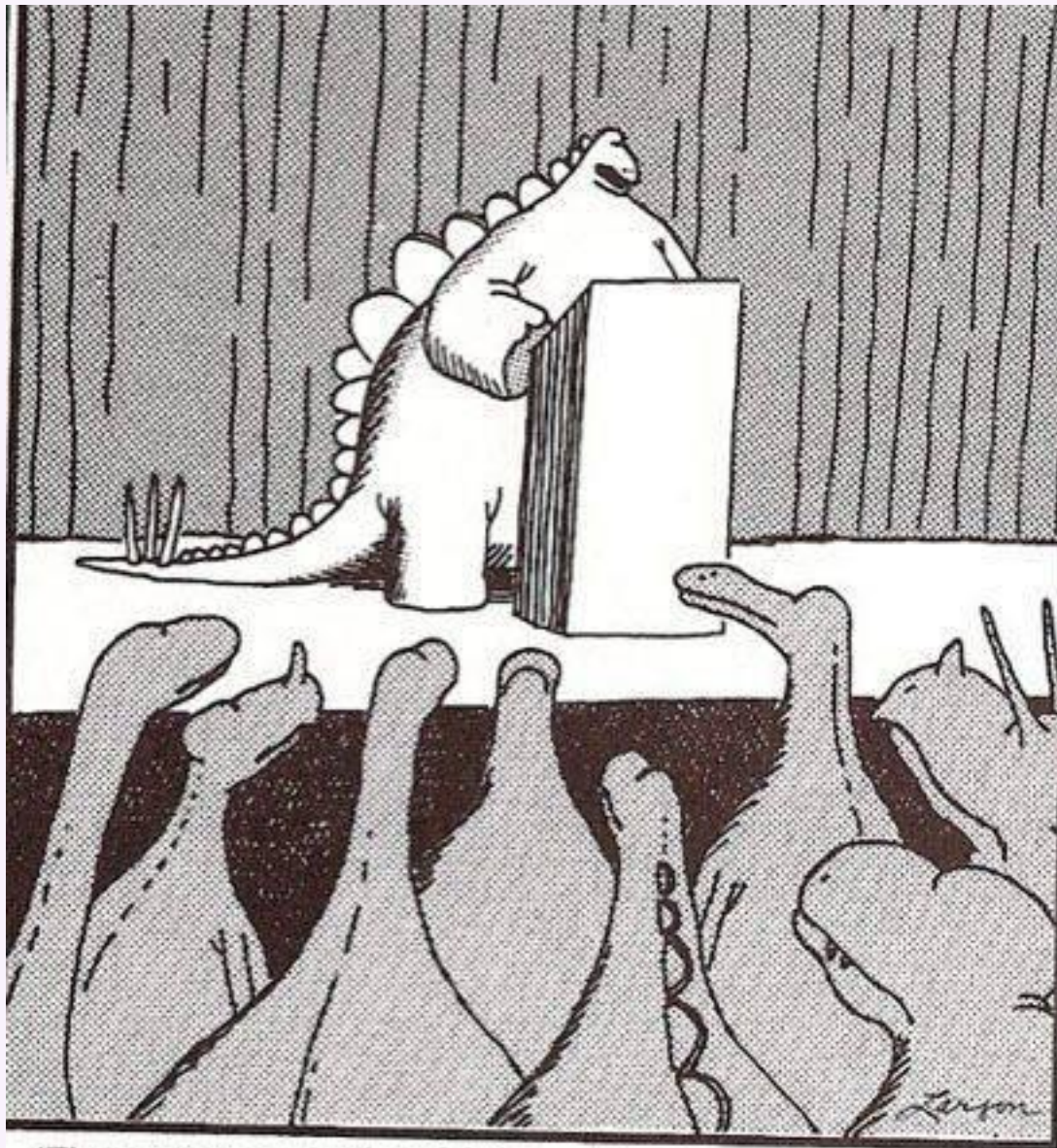
Celebrities?

U.N. Predicts Disaster if Global Warming Not Checked

PETER JAMES SPIELMANN

June 29, 1989

UNITED NATIONS (AP) — A senior U.N. environmental official says entire nations could be wiped off the face of the Earth by rising sea levels if the global warming trend is not reversed by the year 2000.



"The picture's pretty bleak, gentlemen. ... The world's climates are changing, the mammals are taking over, and we all have a brain about the size of a walnut."

5:30

5:25

5:28

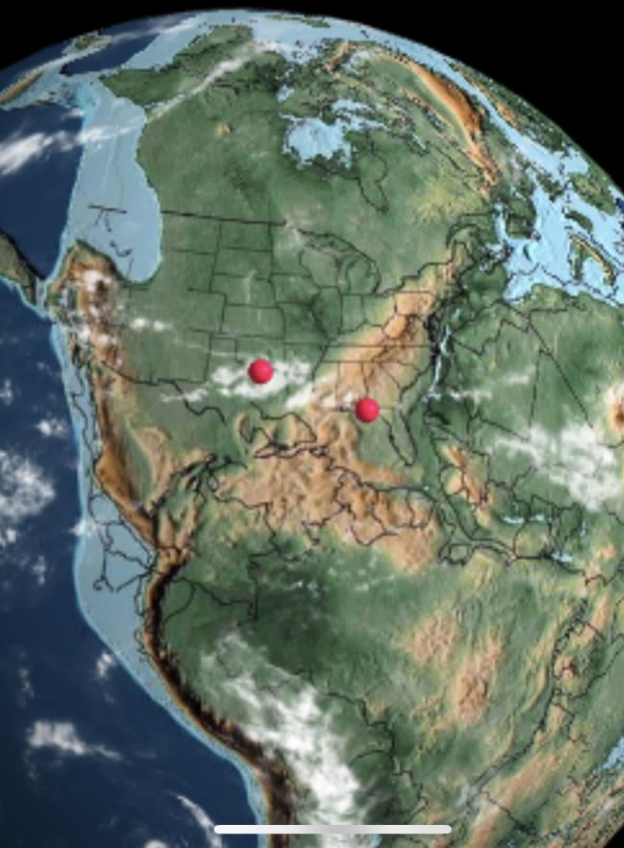
[dinosaurpictures.org](#) [dinosaurpictures.org](#) [dinosaurpictures.org](#)

Earth look like 220 million years ago? Earth look like 90 million years ago? Earth look like 0 years ago?

US

US

US



Change: 2021 Galapagos—Darwin's Arch



MANY NOW THINK WE NEED TO TRANSITION FROM FOSSIL FUELS

Q: *Generally speaking, do you think transitioning to a 100% clean economy (eliminating fossil fuel emissions from the transportation, electricity, buildings, industry, and agricultural sectors) would have a positive or negative impact on jobs and economic growth in the United States, or would it have no impact either way?*

climatenexus
Policy

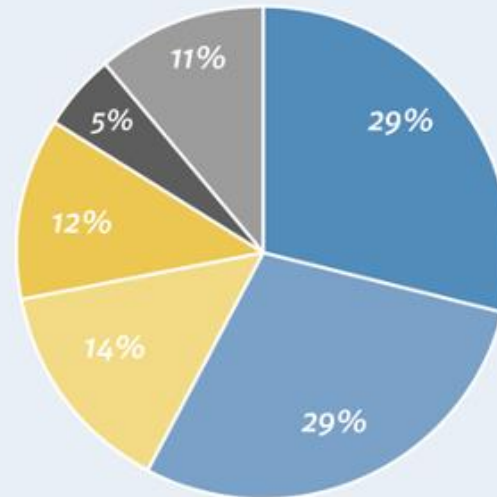
TALE PROGRAM ON
Climate Change
Communication

GEORGE MASON UNIVERSITY
CENTER for CLIMATE CHANGE
COMMUNICATION

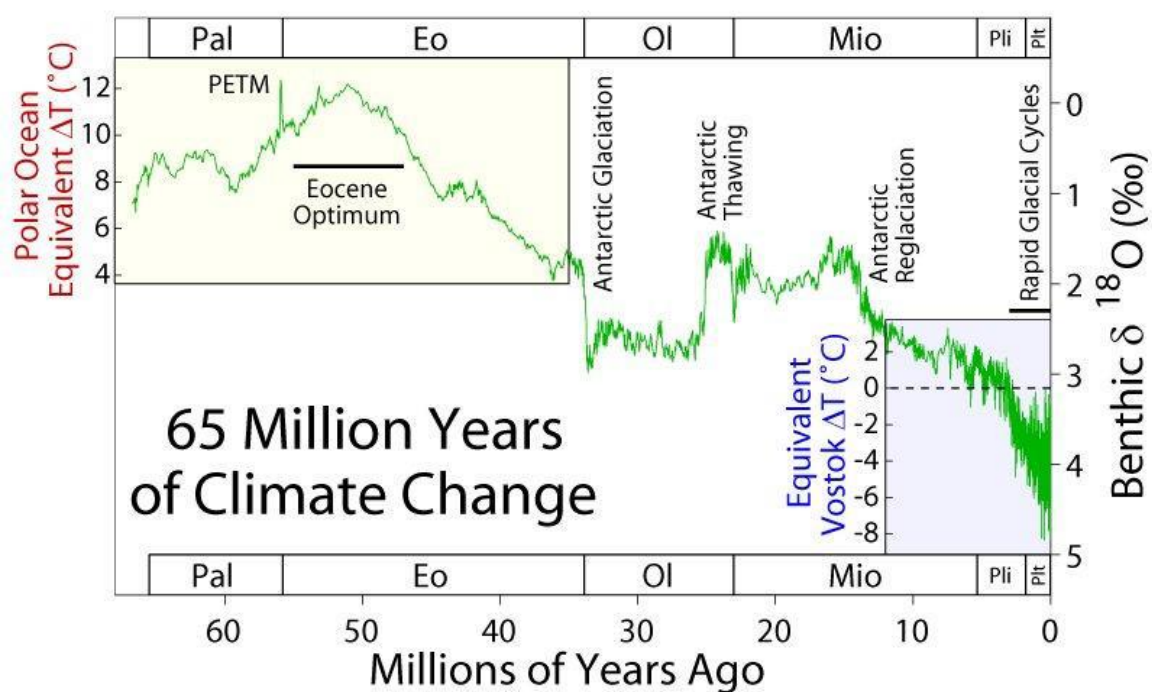
*Due to weighting and rounding, percentages
may not always add up to 100%*

Among Registered Voters in the U.S.

N = 9,087 June 6-11, 2020



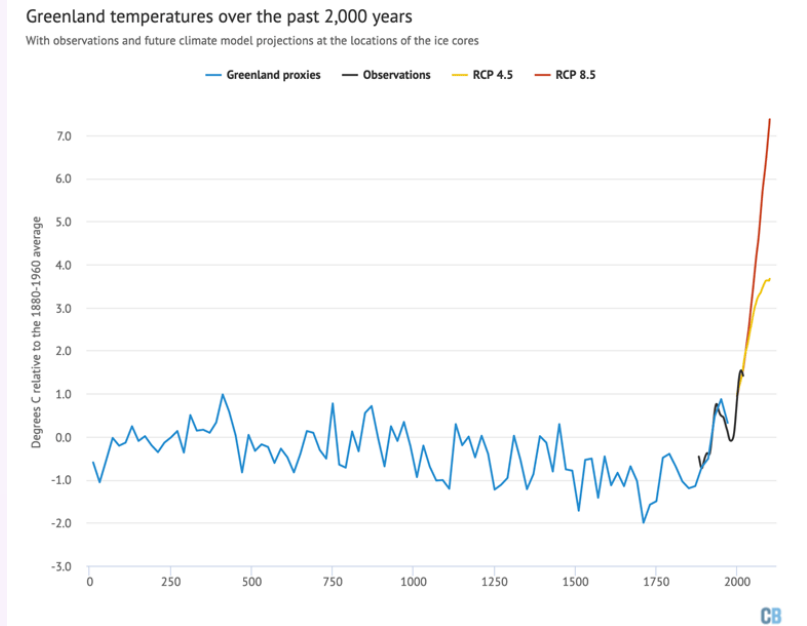
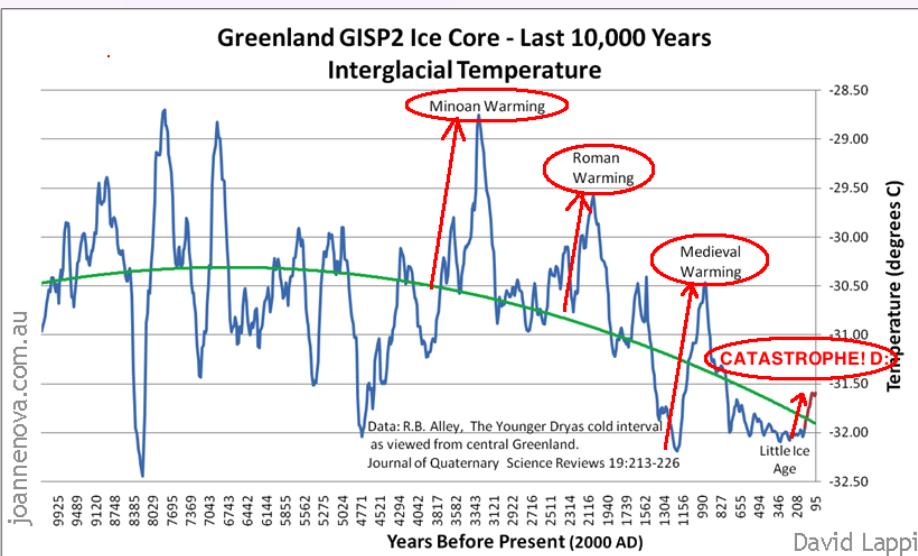
- Very positive impact
- Somewhat positive impact
- Somewhat negative impact
- Very negative impact
- No impact either way
- Not sure



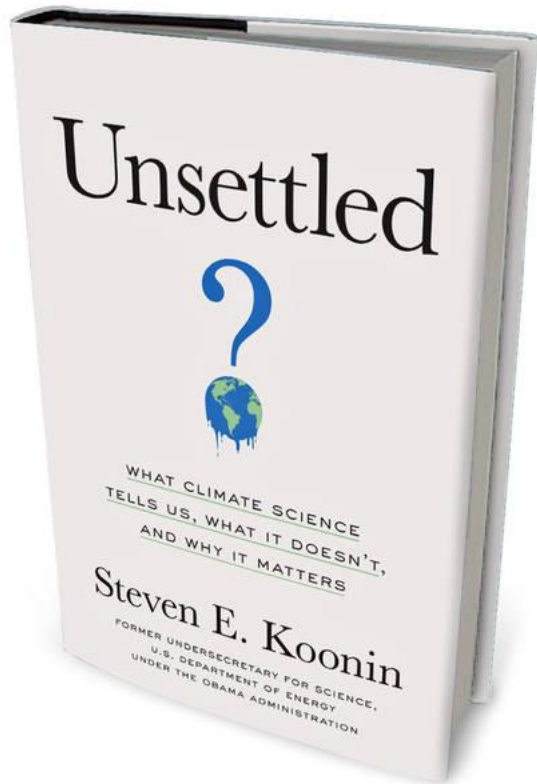
Climate Change & Scale of Time



65 Million Year Scale

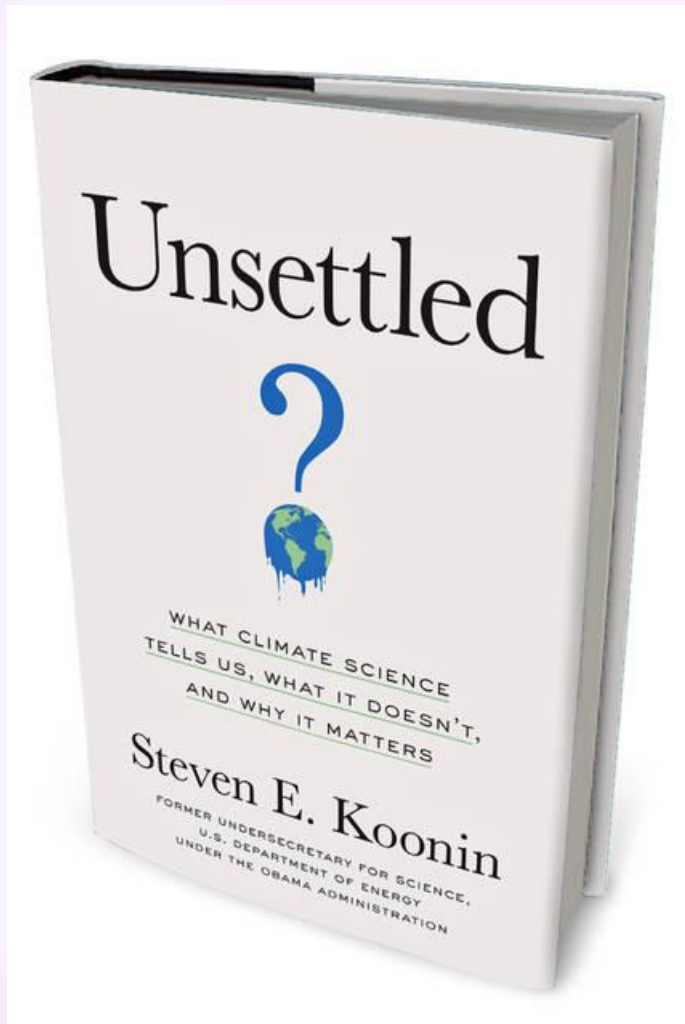


“UNSETTLED” BY STEVEN KOONIN-2021 WHAT CLIMATE SCIENCE TELLS US, WHAT IT DOESN'T..AND WHY IT MATTERS



Member National Academy of Sciences
Theoretical Physics-MIT
VP/Provost at CalTech
Lawrence Livermore Nat'l Lab
UnderSec-Dept of Energy (Obama Adm)
Physics, Engineering & Business Depts NYU

SOME CHAPTER TITLES.....



What we know about Warming
Emissions Explained & Extrapolated
Many Muddled Models
Hyping the Heat
Sea Level Scares
Apocalypses that Ain't
Who Broke "The Science" and Why
Fixing the Broken Science

INTERESTING QUOTES:

“The bottom line is that the science says that most extreme weather events show no long term trends that can be attributed to human influences on the climate.”

From the CSSR* report itself...”the annual number of high temperature records set (across the U.S.) shows no significant trend over the past century nor over the past 40 years”.

“US tornados have become more benign as the globe has warmed over the past 75 years.” (less colder nights and relatively no change in hotter days i.e.,-a milder warmer Earth with fewer big extremes)

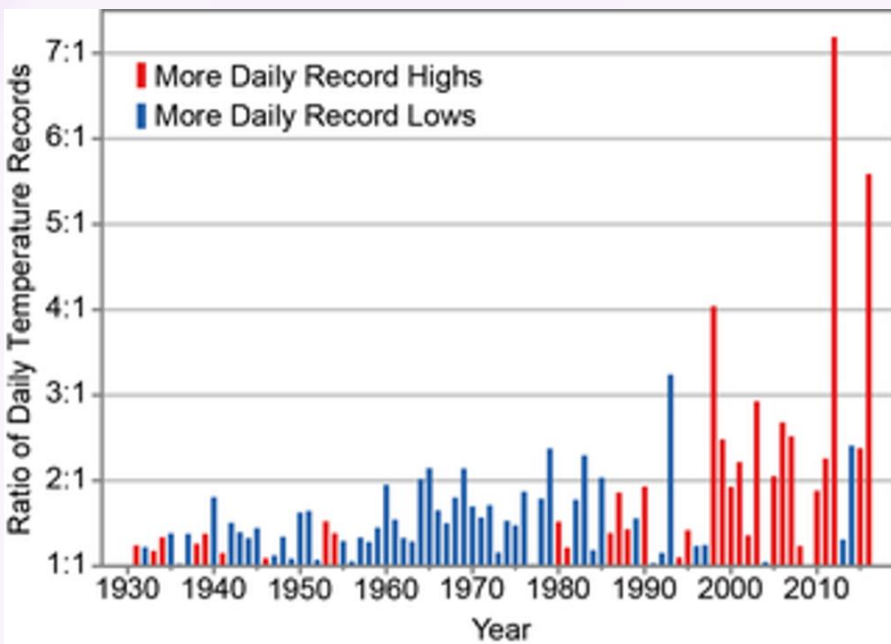
He goes on to address:

Wildfires, Sea Level Changes, Droughts, Tornados.....Too many quotes to put into one talk.

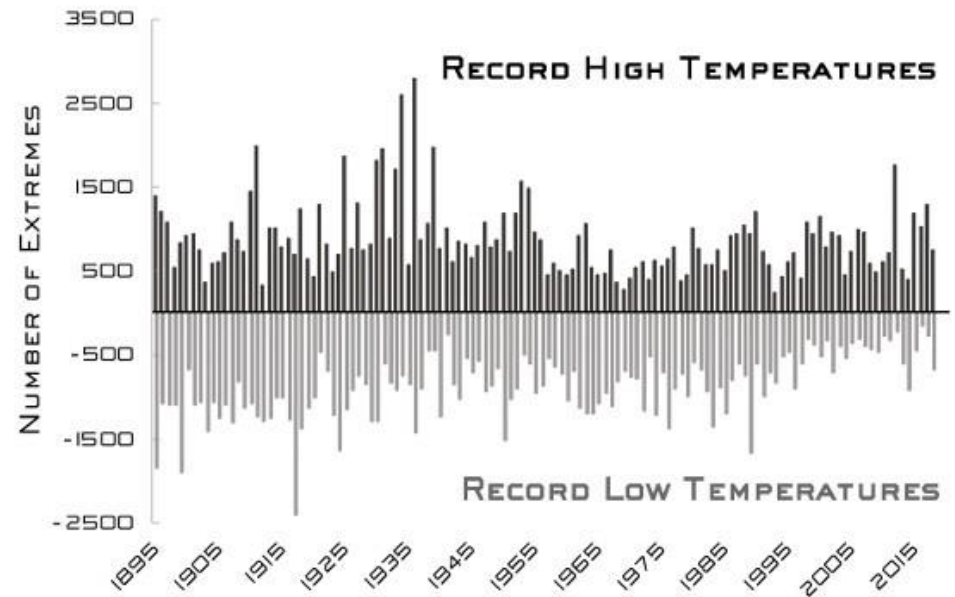
*CSSR-Climate Science Special Report, 2017, Globalchange.gov



The summary of the most recent U.S. government climate report, says heat waves across the U.S. have become more frequent since 1960, but neglected to mention that the body of the report [shows](#) they are no more common today than they were in 1900.



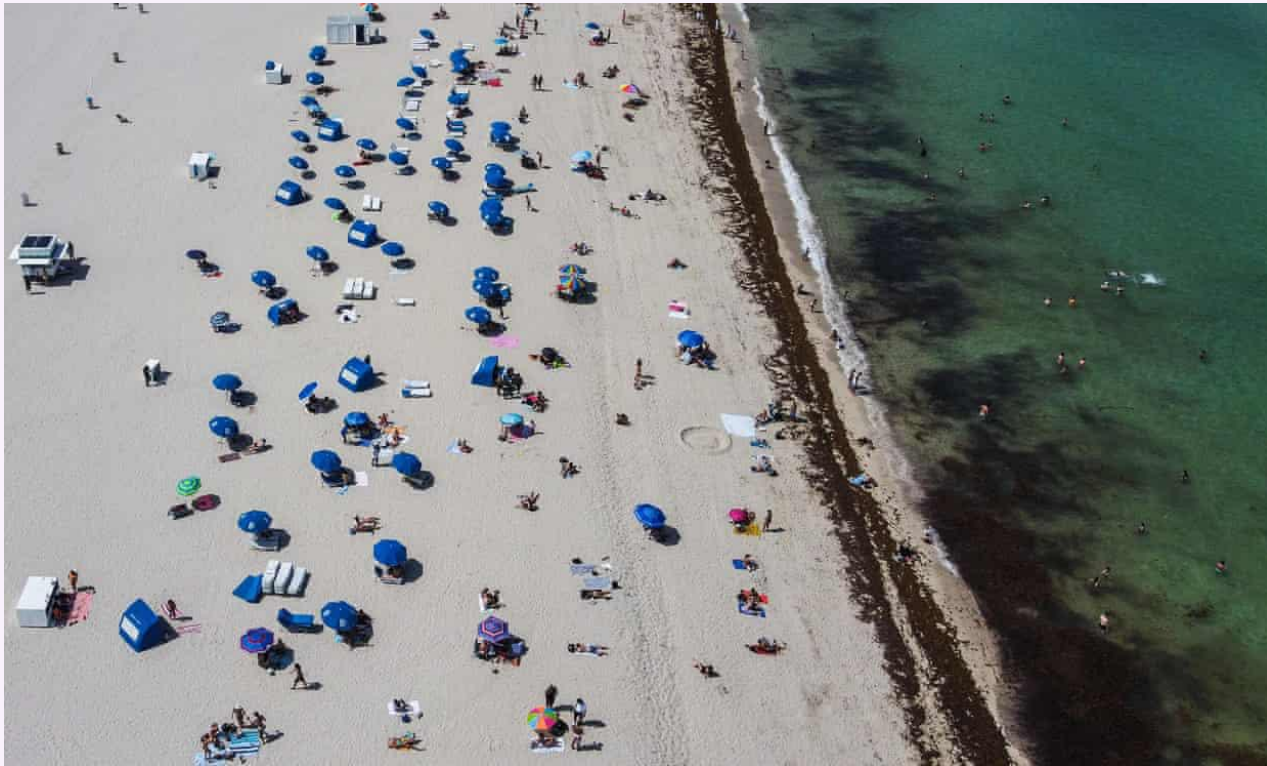
Ratio of Highs/Lows
Looks like runaway heating!



Actual Number of High and Lows
Not so much....Actually about the same
Record Hot days just less colder nights

Ratios are very, very misleading!!!!

MIAMI'S CHIEF HEAT OFFICER CALLS FOR ACTION ON 'SILENT KILLER' IN CLIMATE CRISIS—MAY 27, 2021



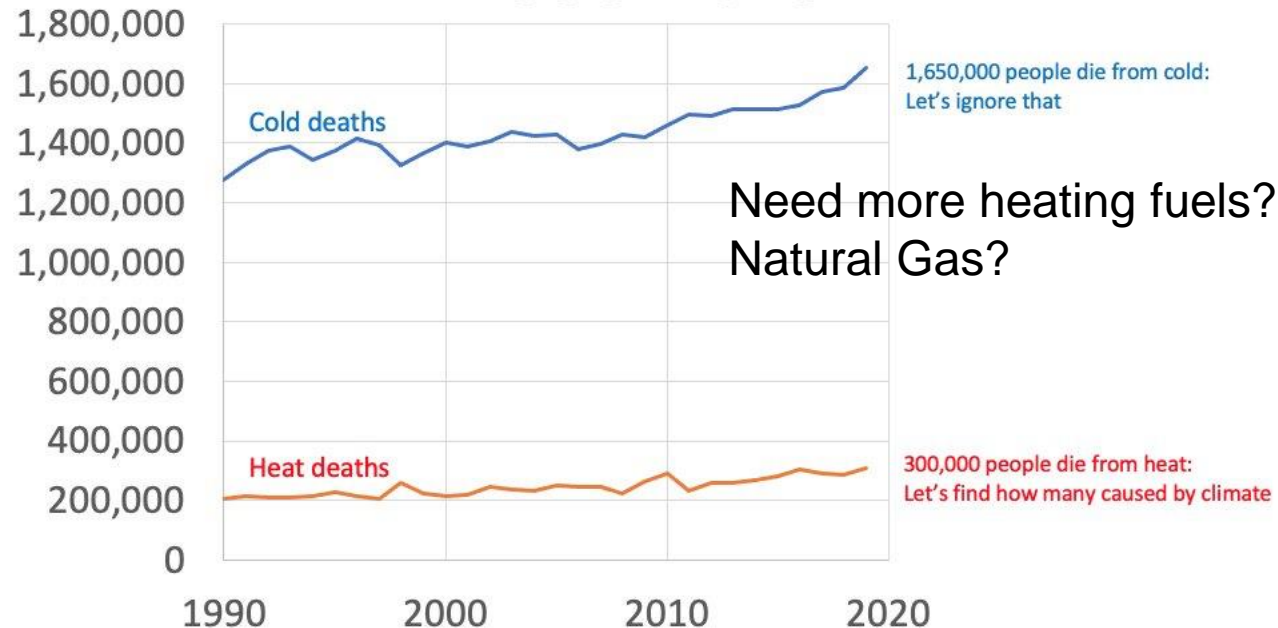
STUDY: COLD KILLS 20 TIMES MORE PEOPLE THAN HEAT

DOYLE RICE

USA TODAY. MAY 20, 2015

“British journal *The Lancet* — analyzed data on more than 74 million deaths in 13 countries between 1985 and 2012. Of those, 5.4 million deaths were related to cold, while 311,000 were related to heat.

Global Deaths: Heat & Cold 1990-2019

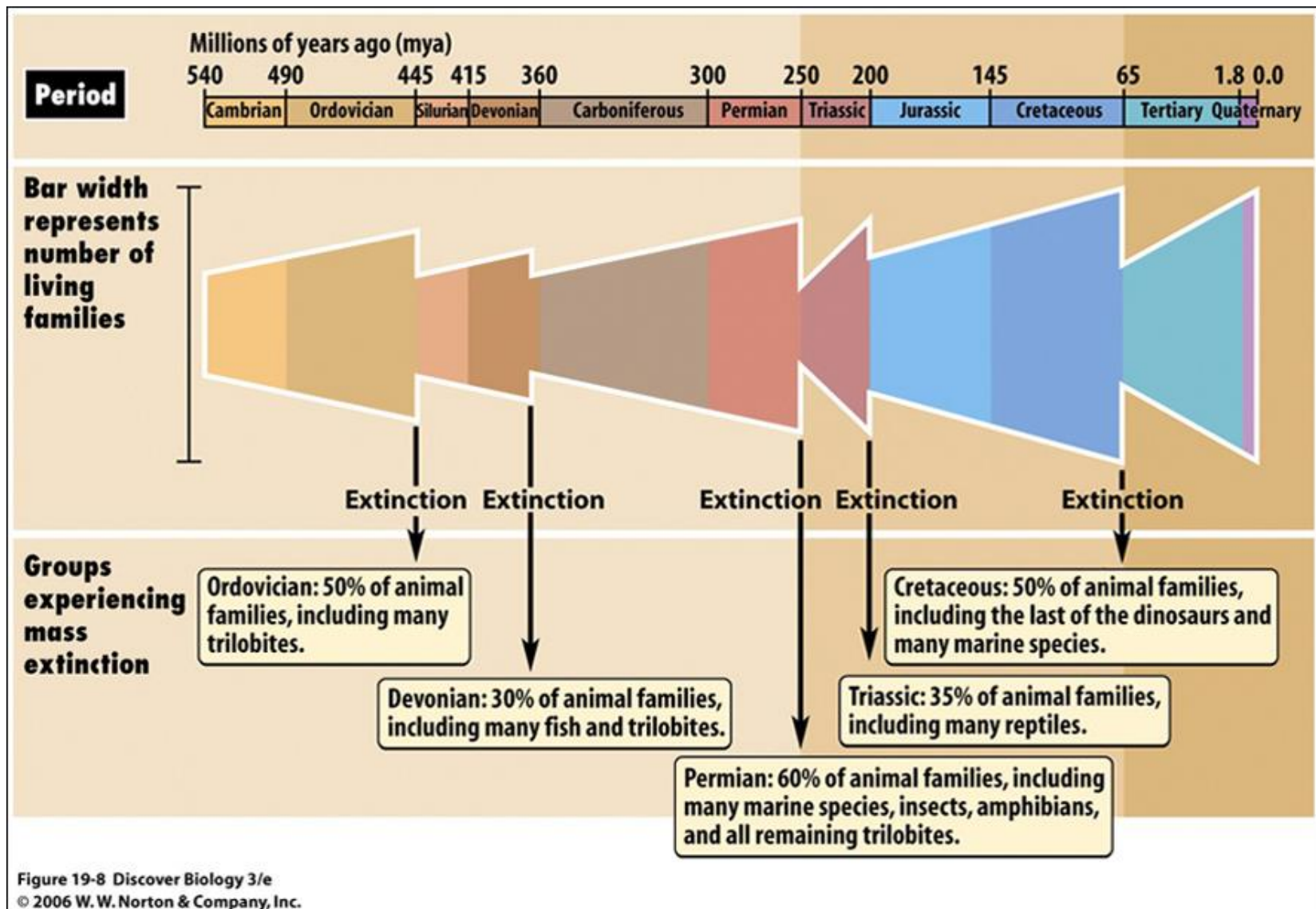


Sources: Global Burden of Disease, <http://ihmeuw.org/5fyg> and <http://ihmeuw.org/5fyf>, twitter.com/bjornlomborg

Cold Earth = Massive Glaciers = 5 Global Mass **Extinctions**

Followed By Warm Earth = **Explosion of Life**

Rock Record Shows Global Cooling is a Species Killer



UN-IPCC*, CLIMATE CHANGE REPORT

“CODE RED FOR HUMANITY” 8/9/21

Irreversible changes due to GHGs

Extreme weather will become more intense and frequent

Higher frequency of hurricanes, droughts, floods and fires globally

Arctic will likely melt followed by sea level changes

Wetter in some areas and dryer in others

Solution: Carbon Tax

*Intergovernmental Panel on Climate Change

Countries with the most CO2 emissions from fossil fuels

In 2019, the world's six largest carbon dioxide emitters together accounted for 51% of the global population and 67% of total CO2 emissions from fossil fuels.

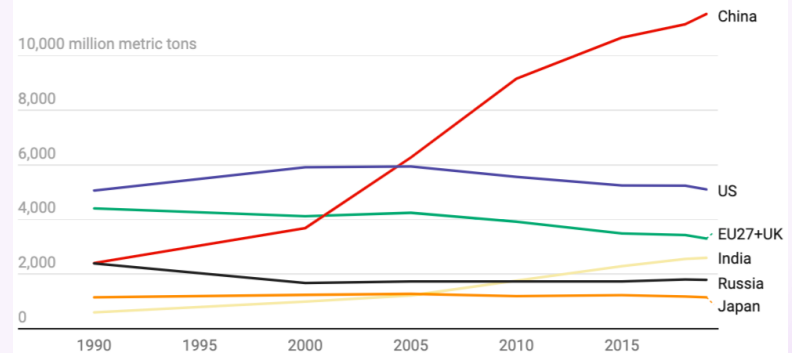
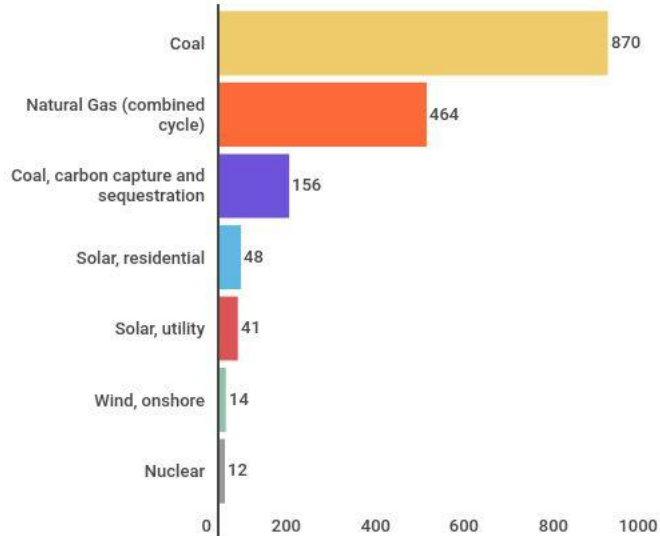


Chart: The Conversation/CC-BY-ND • Source: [European Commission](#) • [Get the data](#)

MAKE EVERYTHING ABOUT CO₂

Estimated Carbon Footprints

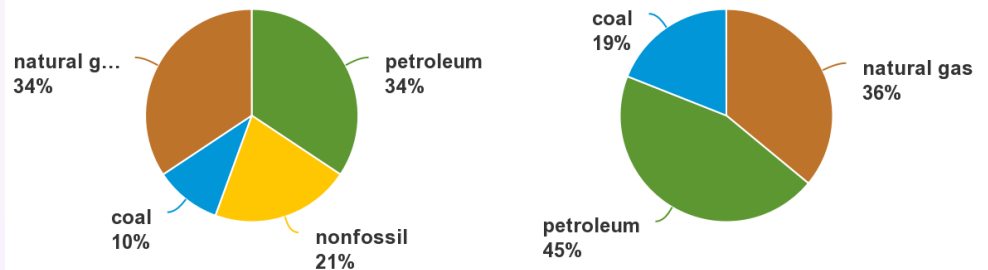
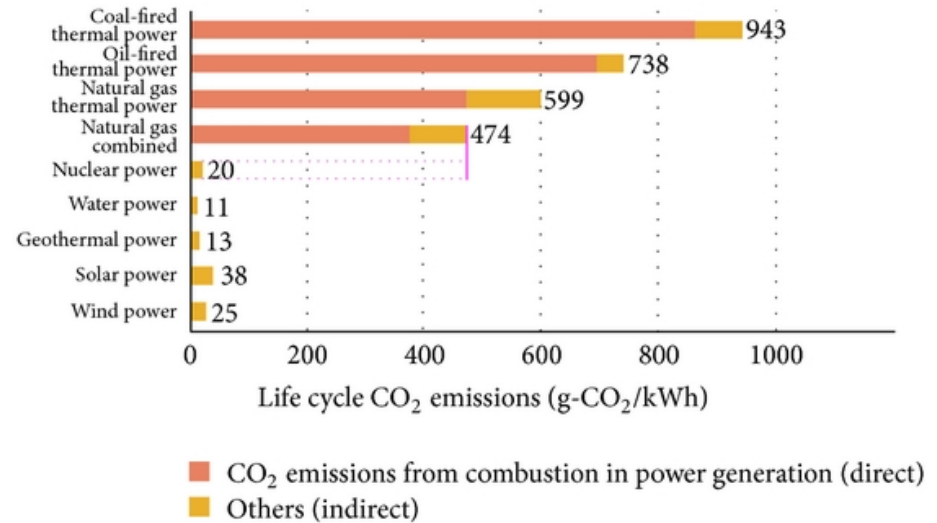


grams of CO₂ per kilowatt of electricity produced

Source: Joshua D. Rhodes, University of Texas at Austin, Energy Institute, 2017



CO₂ emissions of several power sources per electric-generating capacity (including methane)



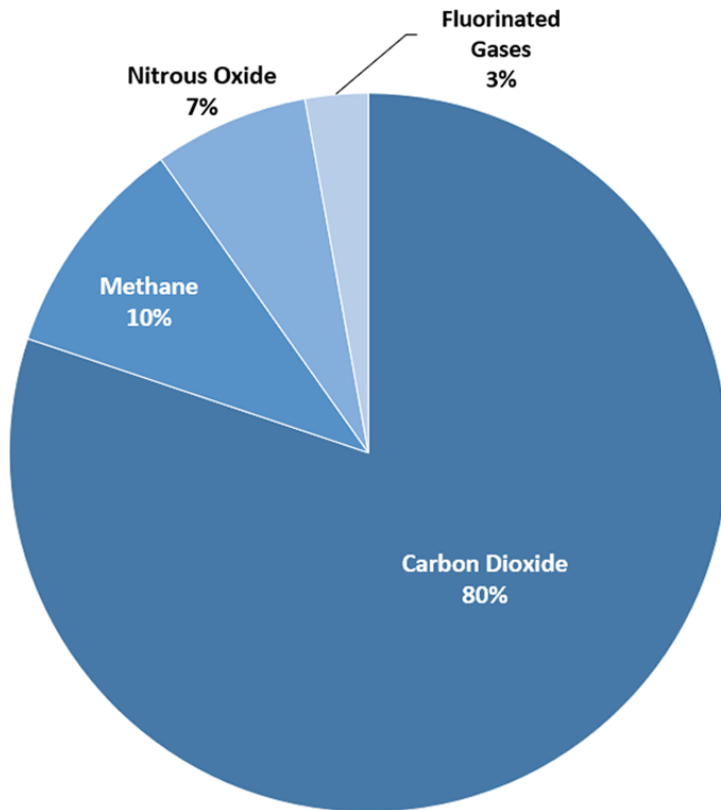
Source: U.S. Energy Information Administration, *Monthly Energy Review*, Tables 1.3 and 11.1, April 2021, preliminary data



Note: nonfossil is nuclear and renewable energy.

IS CO₂ REALLY THE WORST GHG??

Overview of U.S. Greenhouse Gas Emissions in 2019



Source: EPA, Overview of Greenhouse Gases, 2020

Yes...By Volume Emission!
But, is it the worst for GHG for global warming?

There is actually something called **Global Warming Potential or GWP**

For each greenhouse gas, a [Global Warming Potential \(GWP\)](#) has been calculated to reflect how long it remains in the atmosphere, and how strongly it absorbs energy. Gases with a higher GWP absorb more energy than gases with a lower GWP, and thus contribute more to warming the Earth.

LIST & COMPARISON OF MAJOR GHGs

Compound	Pre-industrial concentration (ppmv*)	Concentration in 2018 (ppmv)	Atmospheric lifetime (years)	Main human activity source	GWP**
Carbon dioxide (CO ₂)	280	408	variable	Fossil fuels, cement production, land use change	1
Methane (CH ₄)	0.715	1.869	12	Fossil fuels, rice paddies, waste dumps, livestock	28
Nitrous oxide (N ₂ O)	0.27	0.331	121	Fertilizers, combustion industrial processes	265
HFC 23 (CHF ₃)	0	0.000024***	222	Electronics, refrigerants	12,400
HFC 134a (CF ₃ CH ₂ F)	0	0.000062***	13	Refrigerants	1,300
HFC 152a (CH ₃ CHF ₂)	0	0.0000064***	1.5	Industrial processes	138
Perfluoromethane (CF ₄)	0.00004	0.000079***	50,000	Aluminum production	6,630
Perfluoroethane (C ₂ F ₆)	0	0.0000041***	10,000	Aluminum production	11,100
Sulphur hexafluoride (SF ₆)	0	0.0000073***	3,200	Electrical insulation	23,500

*ppmv = parts per million by volume, **GWP = 100-year global warming potential, ***Concentration in 2011
Water vapor not included in table, see bullet.

Look at SF₆ compared to CO₂!!!!

SHOULD WE WORRY ABOUT SF6?

Why we should be worried about SF6

1 kg
of SF6

Is equivalent to 23,500 kg of CO2



The global installed base of SF6 is expected to grow by
75%
by 2030



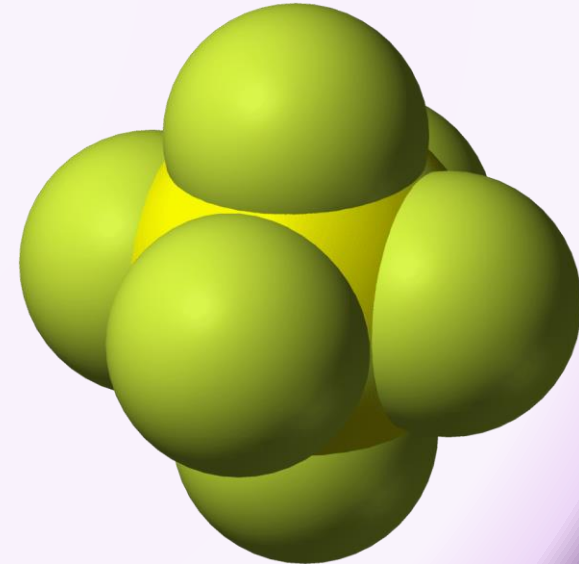
Annual global SF6 emissions are the equivalent
to yearly CO2 emissions produced by approx.
100 million cars



The energy distribution industry is responsible
for
80 %
of SF6 emissions

Based on 5-year percentage change

Source:
McGrath, M. 2019
Godomel, F. 2019



Sulfur Hexafluoride

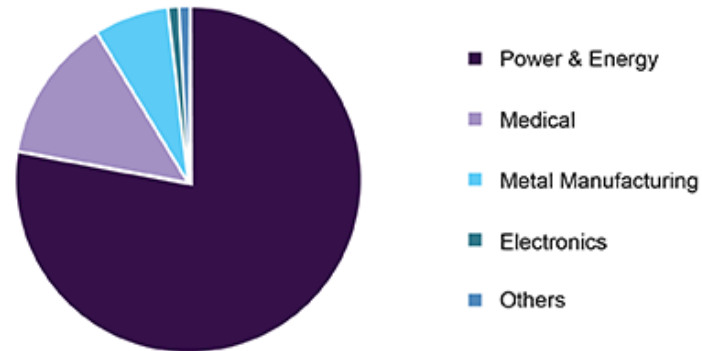
1 lb SF6 = 23,500 lbs of CO2!!

SOURCES OF SF6

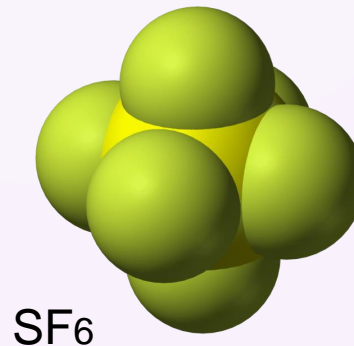
Green Energy is Typically
“Electrification” which requires
SF₆ For Circuit Breakers.....



Global sulfur hexafluoride market share, by application, 2018 (%)



Source: www.grandviewresearch.com

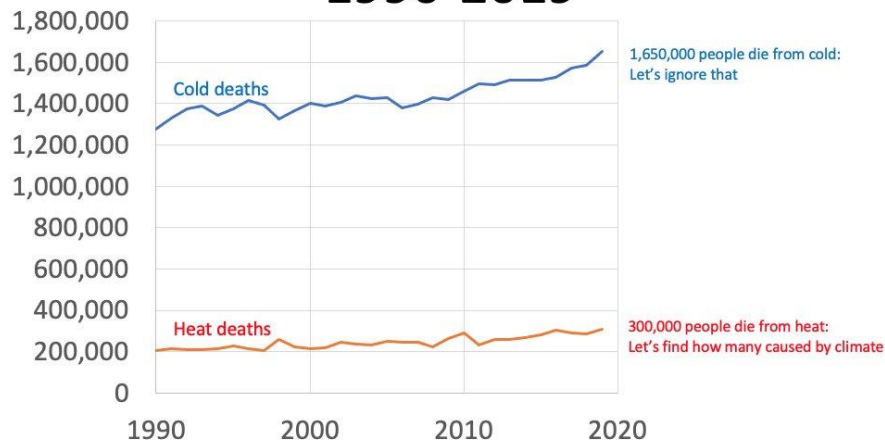


COMPARING CURVES

REMEMBER: WE DON'T WANT WARMER, RIGHT?

Global Deaths: Heat & Cold

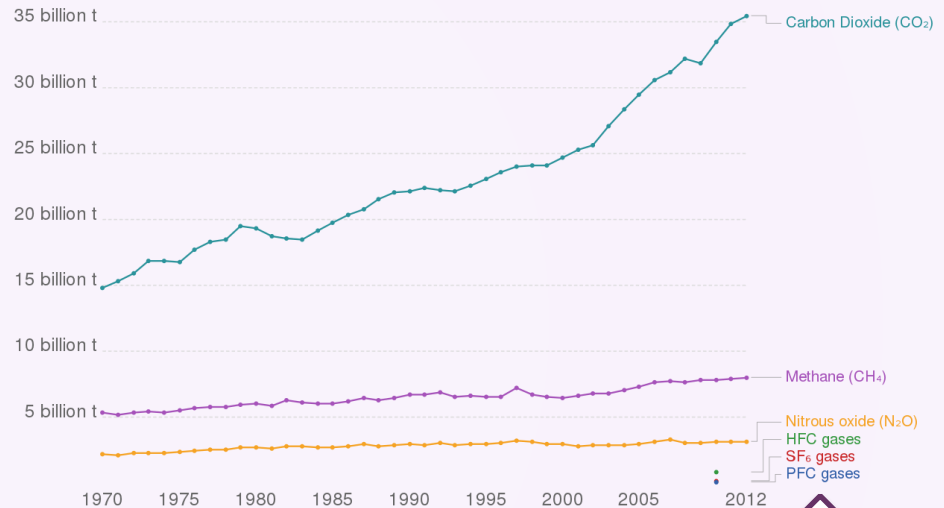
1990-2019



Sources: Global Burden of Disease, <http://ihmeuw.org/5fyg> and <http://ihmeuw.org/5fyf>, twitter.com/bjornlomborg

Greenhouse gas emissions by gas, World

Global greenhouse gas emissions by gas source, measured in tonnes of carbon dioxide equivalents (tCO_{2e}). Gases are converted to their CO_{2e} values based on their global warming potential factors. HFC, PFC and SF₆ are collectively known as 'F-gases'.

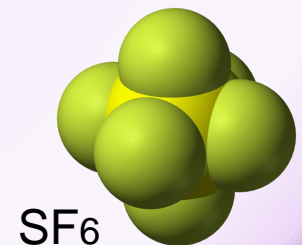


Source: European Commission (JRC); Netherlands Environmental Assessment Agency (PBL); EDGAR



Green Energy “Green”house gasses
Up to 23,000 X more potent than CO₂

So let's make a lot want more SF₆???

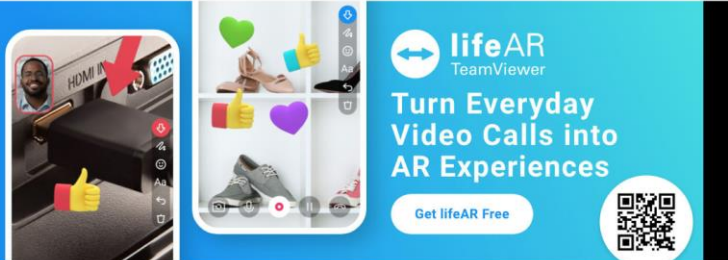


FUTURE GROWTH OF GHGs

Sulphur Hexafluoride (SF₆) is described as the world's worst greenhouse gas. It's 23,500 times more potent than CO₂. Global annual emissions are 8,100 tonnes, equivalent to the CO₂ emissions of 100m cars. It has an atmospheric lifetime of over 3,000 years and its installed base is expected to **grow by 75% by 2030, 100% by 2050!**

Forbes

ADVERTISEMENT



lifeAR
TeamViewer

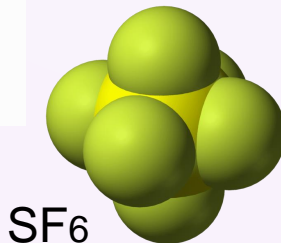
Turn Everyday Video Calls into AR Experiences

Get lifeAR Free

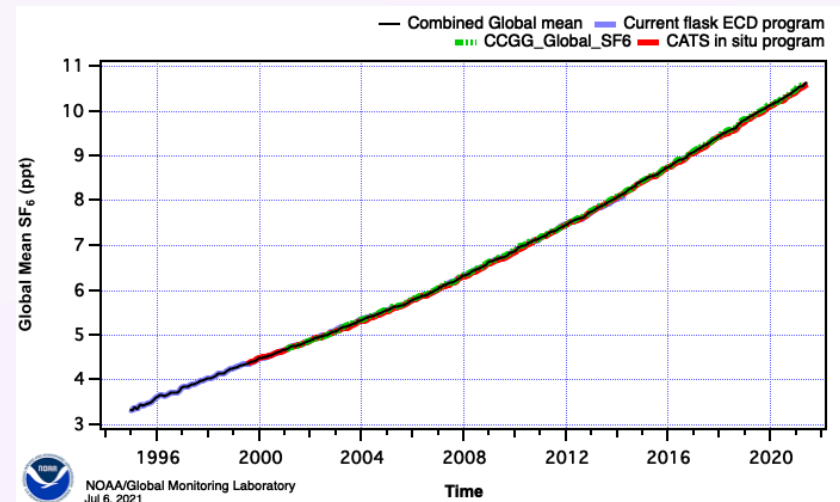
The advertisement features a blue background with a central image of a person's face in a video call, surrounded by various AR objects like a heart, a thumbs up, and a shoe. A QR code is visible in the bottom right corner.

Mar 25, 2021, 01:56pm EDT | 2,069 views

SF₆: The Little Gas That Could... Make Global Warming Worse

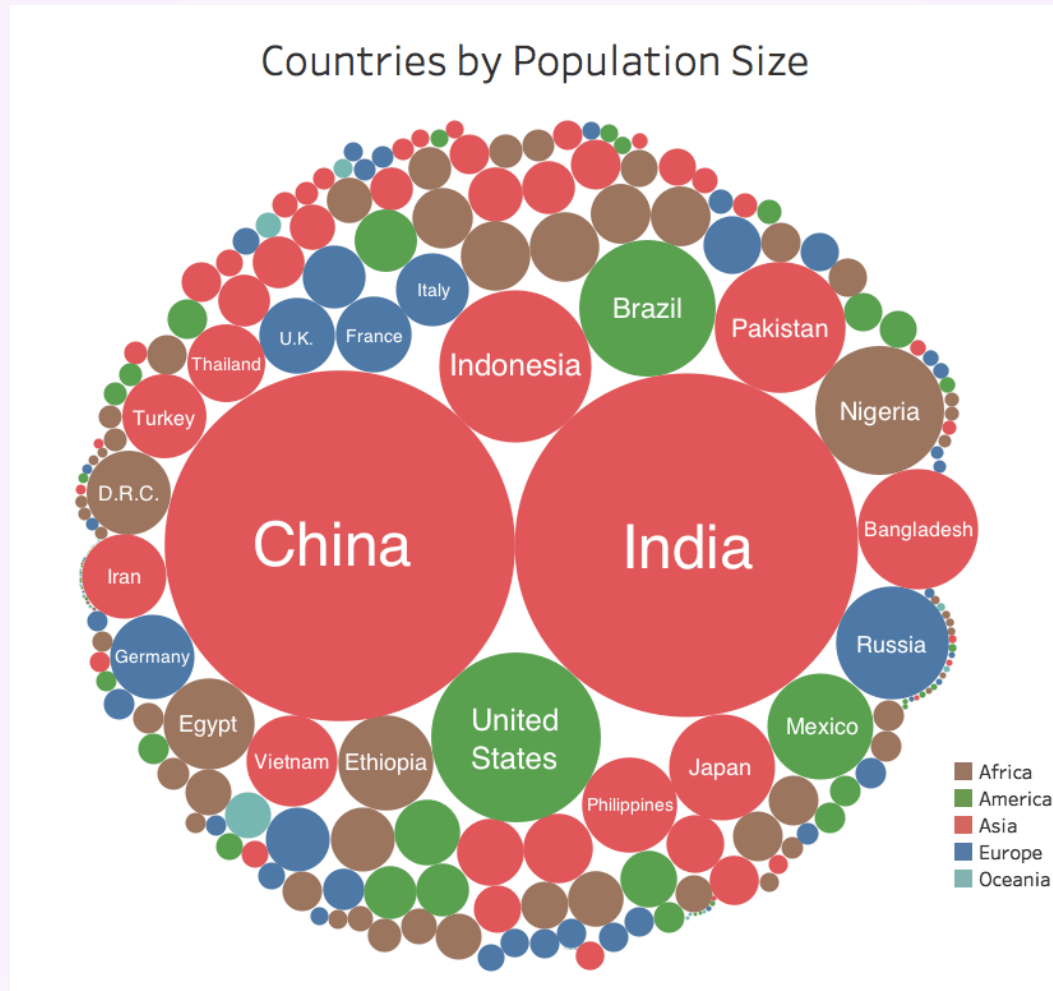


“The annual emissions rate rose from about 7.3 gigagrams or Gg estimated in 2008 to about 9.04 Gg in 2018, an increase of 24% over the course of the decade. For reference, 9 Gg of SF₆ equates to GHG emissions of approximately 44 million passenger vehicles driven for one year, or 226 billion pounds of coal being burned.”



Importance Of A Reliable Energy Base??

Food



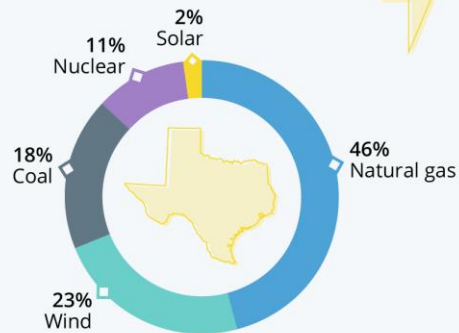
Energy

Water

Energy Disruption—The Texas Grid, 2021

How Texas Generates Its Electricity

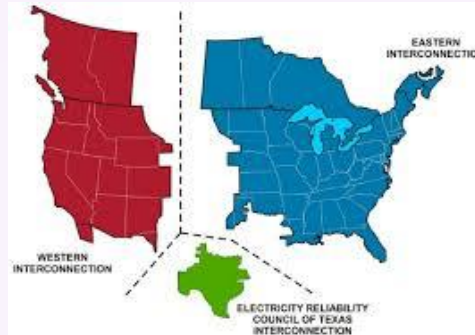
Share of energy (MWh) generated by fuel type in Texas in 2020



Source: ERCOT via Joshua D. Rhodes



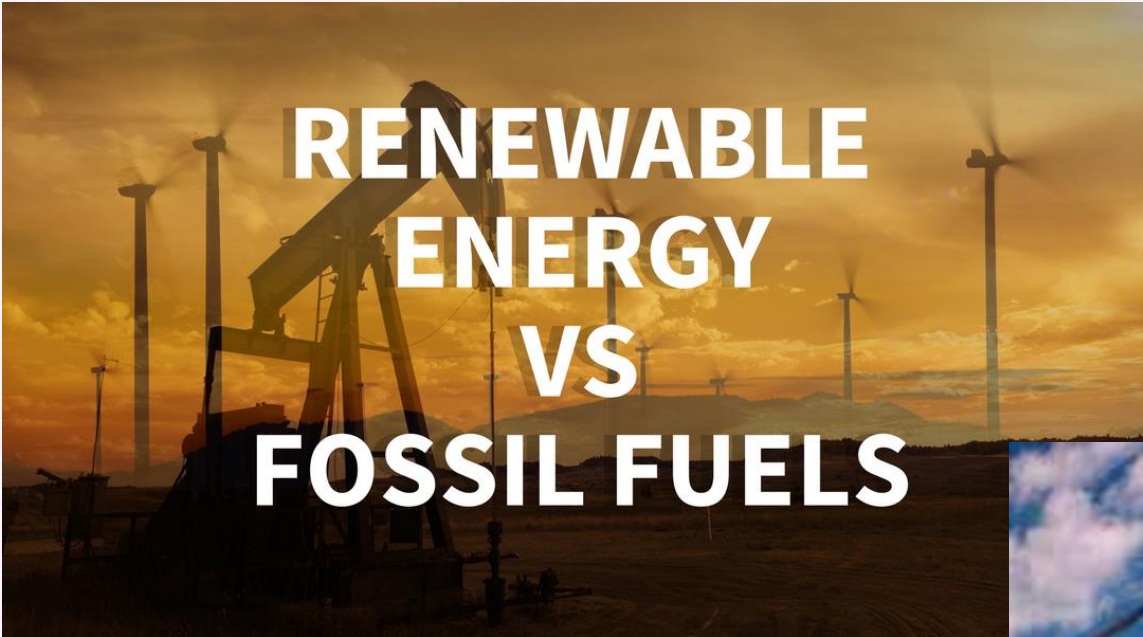
statista



“The Electric Reliability Council of Texas, which operates the state’s main power grid, ordered utility companies to cut power during the February winter storm because demand was outpacing supply so much that it threatened the entire grid. But when utility companies complied, they shut off electricity to natural gas facilities, preventing them from delivering fuel to power plants.”

Texas Legislature Report April, 19, 2021

FOSSIL FUELS VS GREEN ENERGY SOURCES: WHO SHOULD WE TRUST?

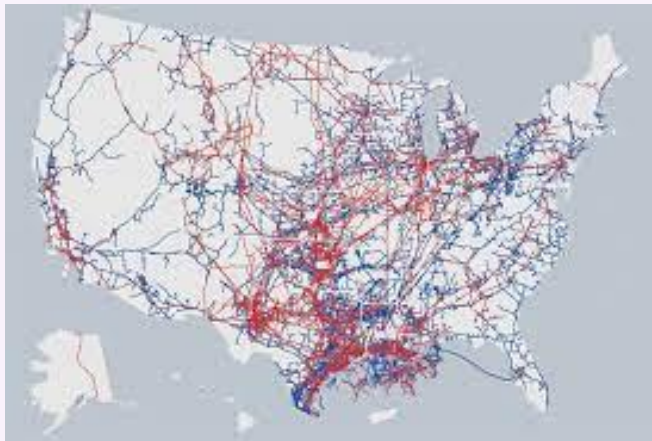


**RENEWABLE
ENERGY
VS
FOSSIL FUELS**



How We Move Energy Fuels In The U.S.

Oil, Gasoline, Diesel, Jet Fuel

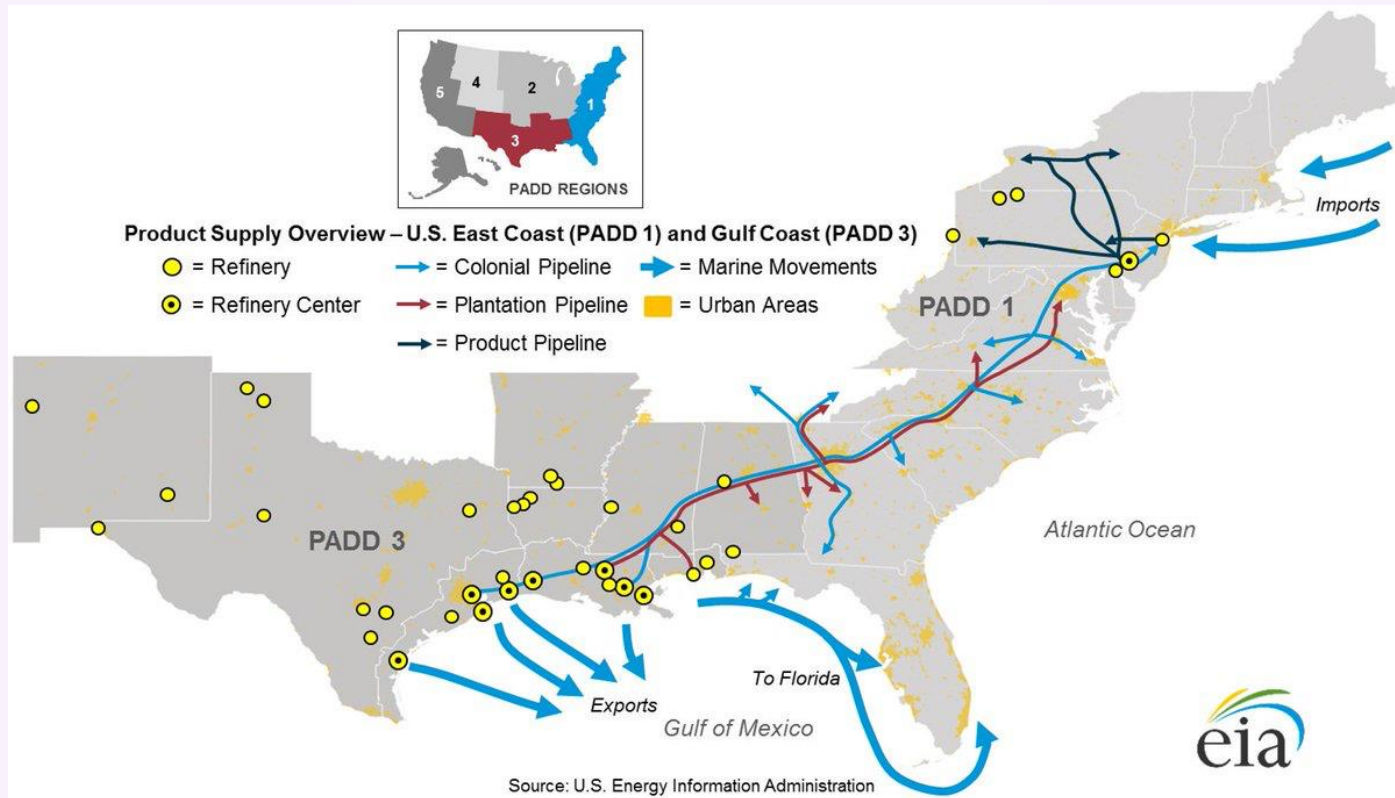


Colonial Pipeline Network—Texas to New York

5,500 miles, 100 M gals/day

45% of East Coast Supplies

50 million Americans



Can you Name 3 Well Known Pipelines?

Colonial—Keystone—Nord Stream II

We Import Energy..Especially Green Energy!

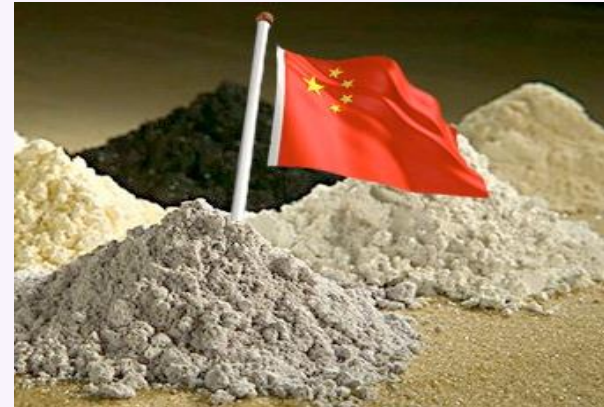
Importing Oil
No Nat Gas!



Importing 9-10 million bbls/day
Mostly Heavy Crude for Diesel!



"Green Technologies"
Rare Earth Elements



China...97%



Batteries, Magnets, Control Rods, Lasers

The Hidden Problem with Most Green Energy....Rare Earths Materials!!



A Look Under the Rare Earth Rock...

1 Ton of Mining of Rare Earths Produces:

- 1 Ton Radioactive Waste Liquids
- 10,000 M³ Waste Gas (S, HF etc)
- 2,000 Tons of Mine Tailings

Source: EWI.ORG, 2016

Google: China, Rare Earths, Leukemia!!

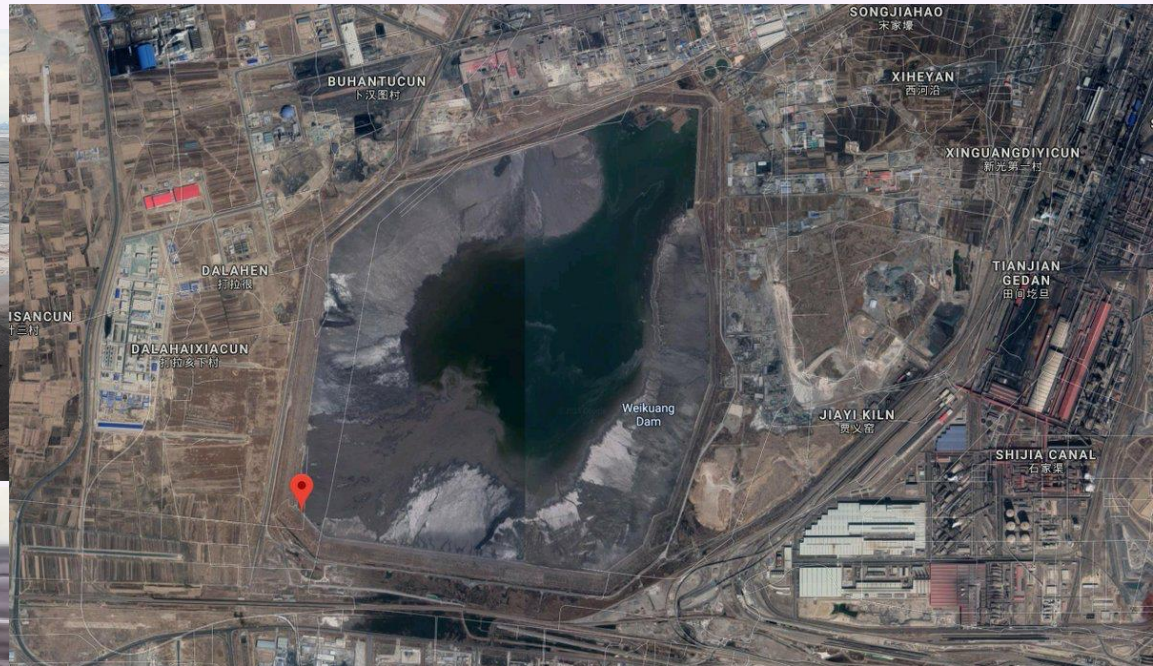
WALT Disney World® Resort

DW = 39 sq miles

With four Theme Parks, two Water Parks, over 20 Disney Resort hotels and an amazing shopping, dining and entertainment district, Walt Disney World Resort has miles upon miles of magical fun.

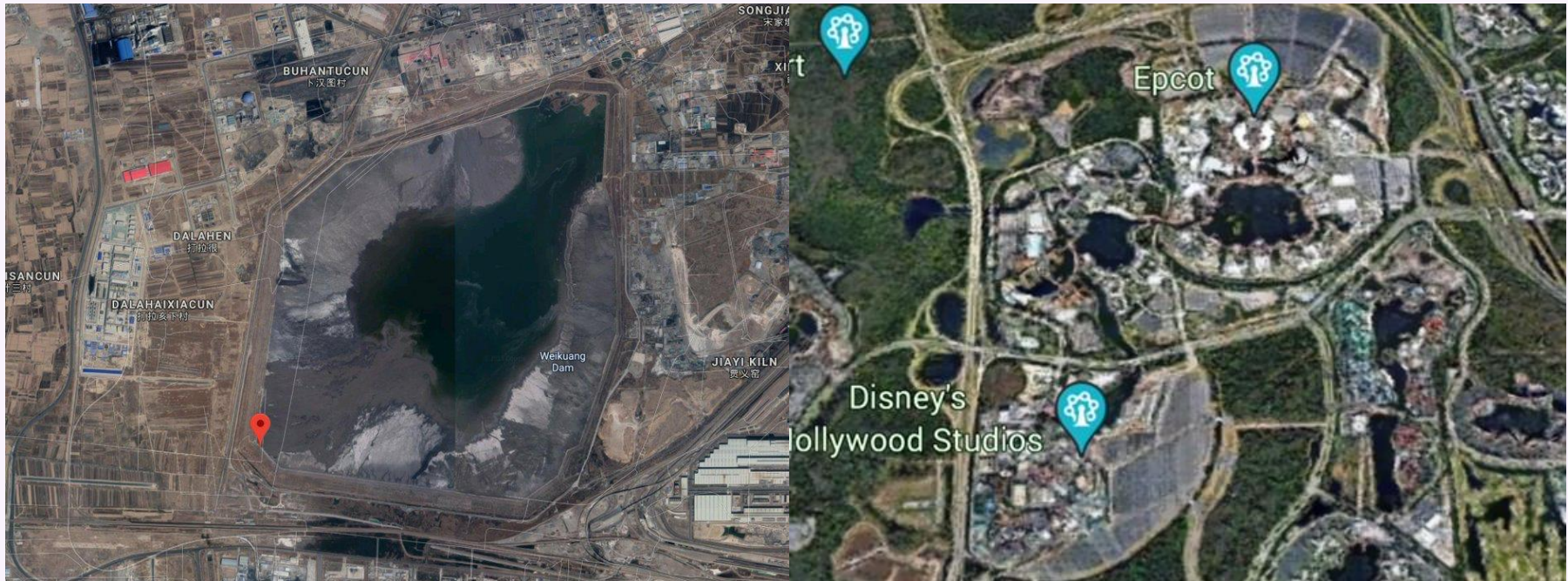


THEN SHIPED BY RAILROAD TO BAOTAU, CHINA FOR ACID PROCESSING & WASTE DISPOSAL



World's Largest Toxic Lake
2 mi X 2 mi = 4 sq mi
>2.5 Million People live 3 miles away

THIS RARE EARTH TOXIC LAKE (4 SQ MILES) IS ABOUT THE SAME SIZE AS....



EPCOT & Disney's Hollywood Studios with Parking and Hotels!!!
Maybe need new "Rare Earth Lagoon Theme Park"



Wind Generators

4000 lbs of Rare Earth Materials per Wind Turbine!!
 45 Wind Turbines = 90 Tons of REMs From China!!



magnets for wind turbine

www.sz-antai.com

atct.en.alibaba.com

The U.S. has over 60,000 “Clean Energy” Wind Turbines

Source: American Wind Association

That's 120,000 Tons of RE and 120,000 Tons of Radioactive Waste!!

HOW MANY WIND TURBINES OR SOLAR PANELS TO MEET GLOBAL POWER NEEDS...TODAY

Steve Sawyer the Global Wind Energy Council's Secretary General, did the math: 21,000 terawatt-hours.... **approximately 3,995,434 onshore turbines.**

The Business Insider, Oct 16, 2016

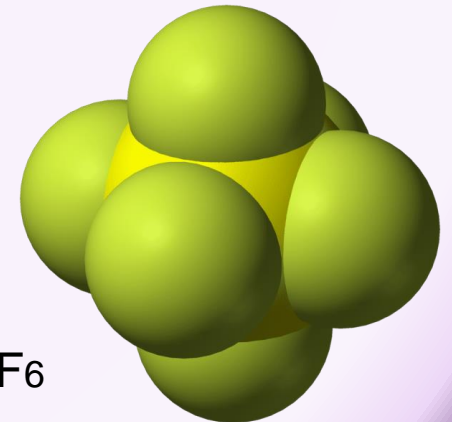
U.S. has 60,000...needs 1.2 million turbines
World = 350,000 need 4 million!!!



It would take **51.4 billion 350W solar panels** to power the world.
www.Axionpower.com



SF₆



Are there any Rare Earth Substitutes??

Yep, Global Mining For COBALT & LITHIUM
Especially For BATTERIES!!



A Look Under The Lithium Rock

Lithium Mining: 80% China and Argentina (Import)

500,000 gal water/ton

Brine produced

Hydrochloric acid needed

Downstream fish kills

Soil and water contamination to environment



A Messy, Global Polluting Business!

Since we are talking batteries.....

So, my Pontoon Needs a Battery!
12V Marine, Group 24
800-1000 MCA, 100 Ah

Options with charger:

1. Traditional Flooded 3-5 yrs
2. AGM/Gel Style 4-6 yrs
3. Lithium Ion 7-10 yrs

Costs:

Traditional Flooded	\$100
AGM	\$200
Lithium Ion	\$1,000

So, what did I buy?

Traditional Flooded: Walmart for \$80!



What would you buy?



Global Mining For Rare Earths, Cobalt and Lithium

Help Afghans Exploit Their Mineral Riches

By Michael Silver

I met with President Trump recently to discuss American development of Afghanistan's mineral deposits. Afghanistan owns one of the world's richest untapped deposits of rare-earth and critical metals. The Afghans cannot develop these vast deposits on their own, but if they get U.S. help to do the job right, they will have an opportunity to move from a war-torn nation to a self-sustaining economy.

These materials are essential to green technology. A misconception in the environmental movement is that green technology eliminates mining. In fact it simply changes what you mine. You can't build an electric car without neodymium and lanthanum, or produce solar or wind energy without indium and gallium.

No doubt the entire supply chain, from rare-earth ore to a solar panel, has less environmental impact than mining and

burning coal, but bottom line it's still mining. And building a multitrillion-dollar infrastructure of wind and solar farms and millions of electric vehicles is going to involve a lot of

China controls the supply of rare-earth and critical metals.

mining. The Afghans are fortunate that plate tectonics pushed much of the good stuff their way, and they are now well-positioned to take advantage.

I proposed this idea to the White House along with a package of suggestions to fill a gaping hole in the plan to rebuild America's manufacturing base. At its most basic, manufacturing has two key operating costs: labor and materials. While the U.S. does a lot of hand-wringing over labor costs, the Chinese are

quietly on their way to controlling every important deposit of rare-earth and critical metals on the planet. The only operating rare-earth mine outside China is in California—and three months ago, it was bought by a consortium that granted its Chinese shareholder the exclusive license to sell the ore.

The Chinese aren't evil, merely smart. The U.S. has taken its eyes off the ball, and Afghanistan provides an opportunity to regain the right focus. One obstacle is a media narrative of rapacious Americans stealing the riches of a defenseless nation, while destroying its environment. One recent article opined: "This isn't to say that Afghanistan cannot profit from its resource wealth—it can and should—but that the United States is not the right country to lead that charge."

Have we forgotten our long history of leading the charge, starting with the Marshall Plan?

If America is serious about bringing manufacturing back, it needs to get in the minerals game—and to do so in a way that benefits the Afghans and other sovereign owners of these deposits. It's what the Chinese are doing all over the world—building roads, rail lines and power plants in exchange for ground leases.

The U.S. can do it too. It has in the past, I was personally involved in assisting the Chinese government when it began exporting rare-earth metals in the 1990s under Deng Xiaoping's policy of global engagement. Postwar Afghanistan is the perfect test case for Americans to prove that we are as generous to other nations and as thoughtful in advancing our own interests as the earlier Americans who wrote and implemented the Marshall Plan.

Mr. Silver is chairman and CEO of American Elements.

WSJ 8/31/17 op ed page

Congo-Kinshasa (The Congo): Is Child Labor the Price for E-Cars? Aug 2017
[Copyright](#) © 2017 Deutsche Welle-News Outlet—All Africa



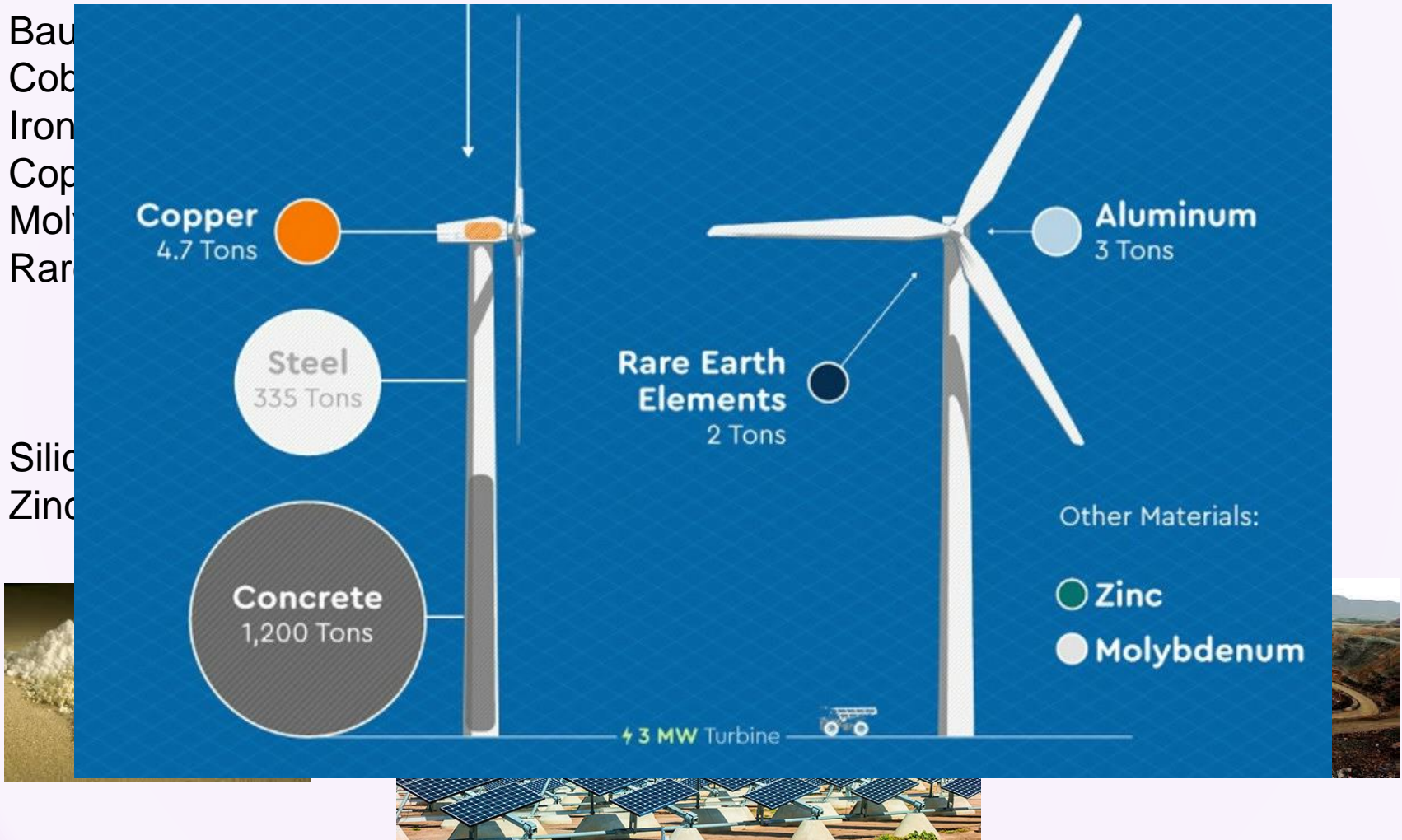
Children as young as seven used for mining cobalt in Africa for batteries, says Amnesty International, Jan 2016

Remember—Mostly mined overseas!

Fact: Green Technologies Need Lots of Raw Materials

Materials to build **Wind Turbines**:

Materials to Build **Solar Panels**:



Mined from 60 countries (NOT in the U.S.) and then shipped throughout the world

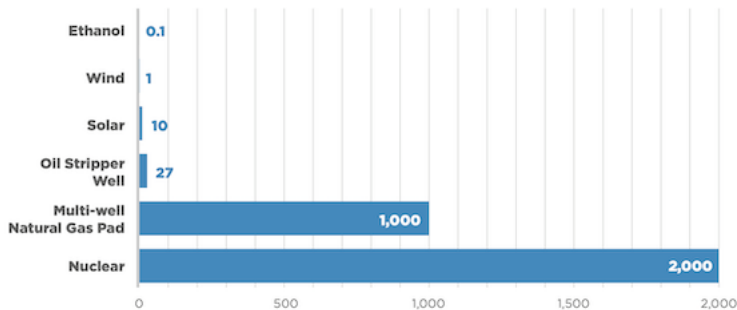
The U.S. Will Need a Lot of Land for a Zero-Carbon Economy

By [Dave Merrill](#)

Published: April 29, 2021 | Updated: June 3, 2021

According to [Princeton University estimates](#) and an analysis by Bloomberg News. By 2050,to be carbon free, the U.S. would need up to four additional South Dakotas (total of 5!) in land area to develop enough clean power to run all the electric vehicles, factories and more.

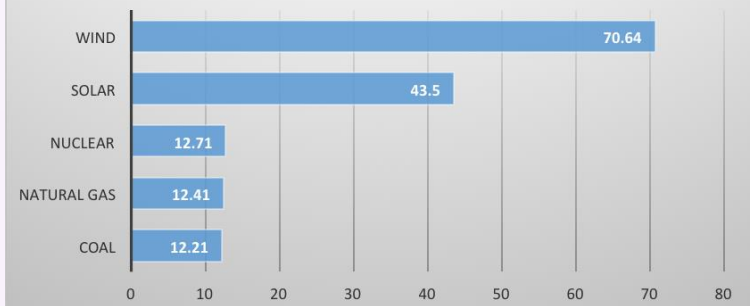
FIGURE 2
Power Density of Various Energy Sources
Power density in watts per square meter (W/m²)



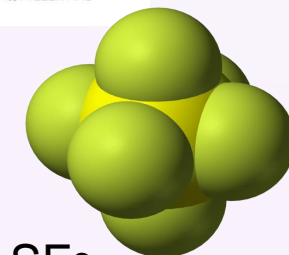
SOURCES: ENERGY, LEIDEN UNIVERSITY; BUREAU OF ECONOMIC GEOLOGY; UNIVERSITY OF TEXAS; MILLER AND KEITH, AUTHOR CALCULATIONS



Land Use by Electricity Source in Acres per Megawatt Produced



Remember....



SF₆

Wind Turbines Disposal?

Wyoming Turbine Blade Disposal Site-900 Blades

<https://desdemonadespair.net/wp-content/uploads/2019/08/Windmill-fan-blades-and-motor-housing-components-wait-for-disposal-at-the-Casper-Regional-Landfill-7-August-2019-Casper-Regional-Landfill.jpg>



The U.S. will have more than 720,000 tons of blade material (mostly fiberglass) to dispose of over the next 20 years, a figure that doesn't include newer, taller higher-capacity versions.

MINING AND “GREEN ENERGY”

U.S is 100% dependent on other countries for 17 key minerals
Wind Turbines and E-Car Batteries = 10X more mineral mining
E-Cars 1,000 lb battery requires 500,000 lbs of mining materials
100 bbls of oil to refine and process one E battery
By 2050, worn out solar panels > 2x plastic waste
Wind Turbines > 3 million tons/yr of waste to be buried
2030 > 10 million tons of battery waste per year

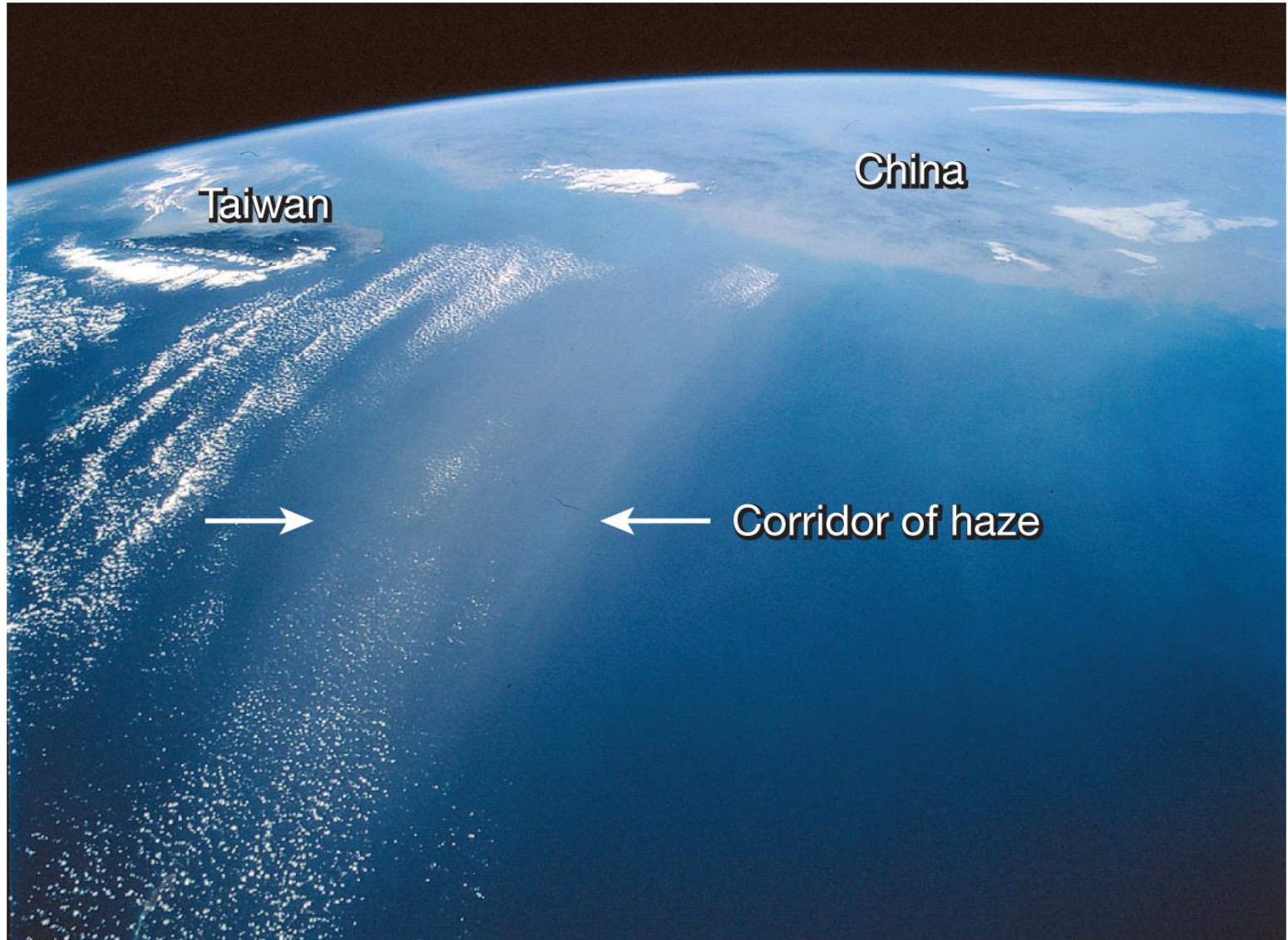


Source: Manhattan Institute, July 9, 2020
Manhattan-institute.org

MINING...RARE EARTH MINERALS INCLUDING LITHIUM...



Mining Air Pollution Haze from China-Climate Change?



© 2012 Pearson Education, Inc.

FRACKING VS MINING: A REAL PROBLEM FOR ANTI-FOSSIL FUEL ACTIVISTS

≡ Forbes

Mar 16, 2021, 09:08am EDT | 3,886 views

Rising U.S. Lithium Industry: A Potential Quandary For Environmental Activists

The Lithium Gold Rush: Inside the Race to Power Electric Vehicles

A race is on to produce lithium in the United States, but competing projects are taking very different approaches to extracting the vital raw material. Some might not be very green.



By [Ivan Penn](#) and [Eric Lipton](#) Photographs by Gabriella Angotti-Jones

May 6, 2021

New York Times



The Seattle Times

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Ad



Goldman Sachs Calls Lithium The New Gasoline
The Financial Star

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A war is brewing over lithium mining at the edge of Death Valley

May 17, 2019 at 10:01 am



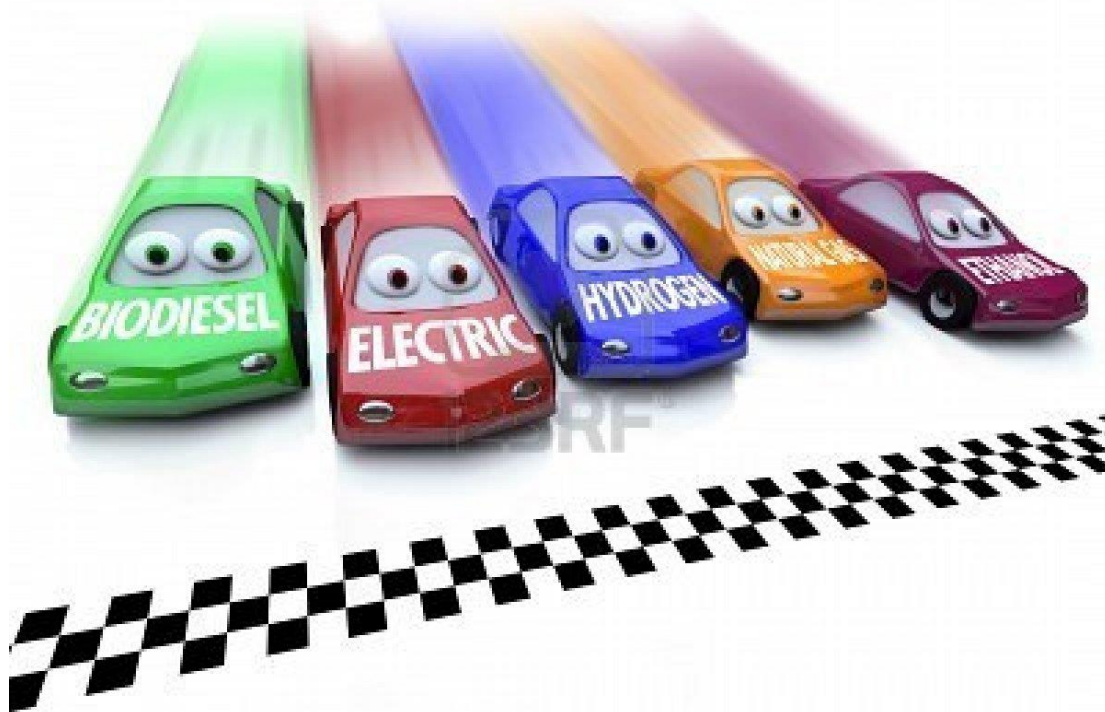
U.S. Potential Rare Earth Resources---DOE \$19M



Alternative Fueled Vehicles

AFV's

Does it have to be Plug-In Electric??



FORD F-150 LIGHTNING EV

Range = 230 or 300 miles

2,000 lb payload

10,000 lb towing capacity

If you tow.....(boat, trailer, etc)

160-200 mile range predicted

45 min charge time to 80%



*F-150 3.5 L-Hybrid

Payload 2,100

12,700 lb Towing Capacity

750 mile range (525 miles towing)

Ford F-150 Lightning EV Emissions



1800 lbs of batteries and electric motors
Average Electric Car has **>10 pounds** of Rare Earths
The Economist, 2010

***1 Million E-Cars = 10 Million lbs of REMs Needed
U.S. = 285 million vehicles = almost 3 Billion lbs REM
World = 1.4 Billion = 14 Billion lbs of REMs



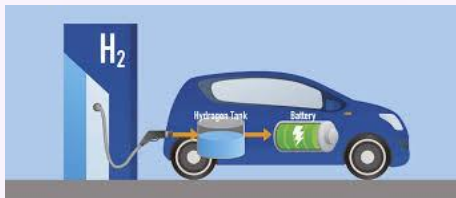
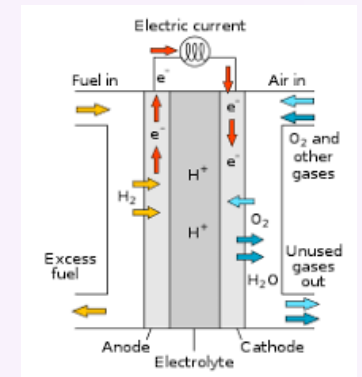
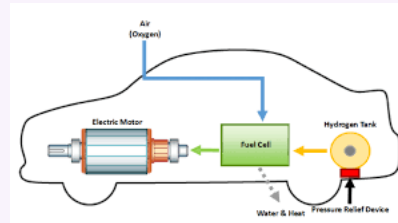
“May be Hazardous To your Health If You Work in China”

Gas Generator for E-Car Charging Station

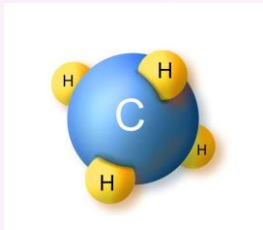


100% Electric Cars/Trucks are Plug-Ins...Right?

WRONG...HYDROGEN POWER!



NATURAL GAS AS A SOURCE OF HYDROGEN??



Natural Gas!!



3 Hydrogen Fuel cells



Air Products makes the Hydrogen for the Space Shuttle
They also made the Hydrogen Fuel Station at Worldsnest
Hydrogen for the Space Shuttle is from Natural Gas

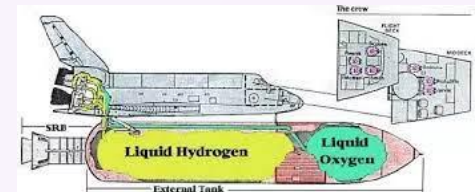
Air Products worlds largest supplier of hydrogen from sustainable sources

- Natural Gas
- Solar
- Wind
- Gasification
- Anaerobic Digester

Robert Plarr
Victoria Peters
Chris Sanders
supports
sustainable integration



The image is a collage. On the left, a woman in a white shirt and jeans is using a hydrogen fuel station. In the center, a space shuttle is launching with a large fire and smoke plume. On the right, an oil pumpjack is visible in a desert landscape. The text is overlaid on the collage.



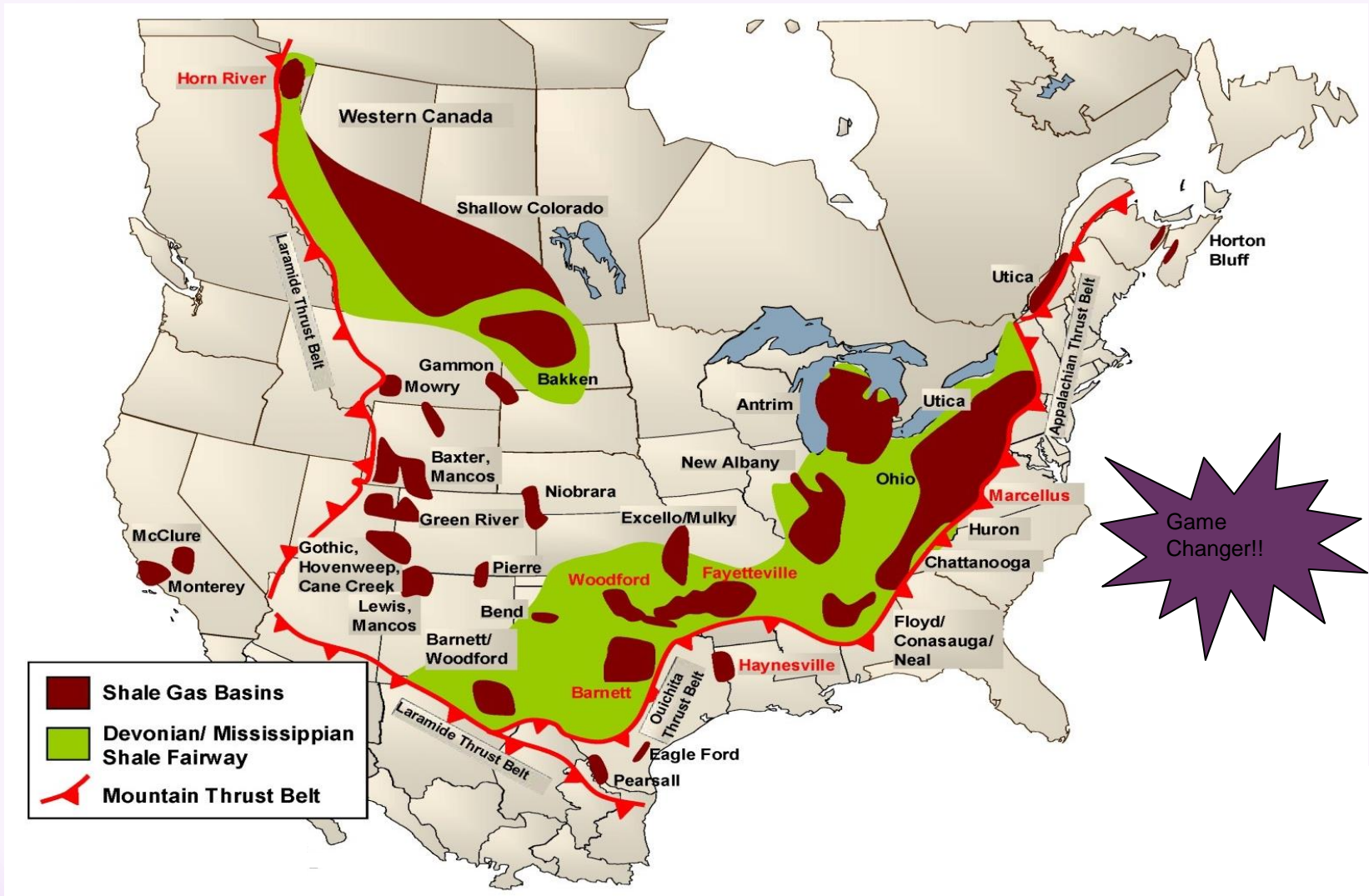
FOR PLANES, TRAINS & AUTOMOBILES.. OH, AND SHIPS!!

The Future is Hydrogen Fuel Cells...
And NATURAL GAS!



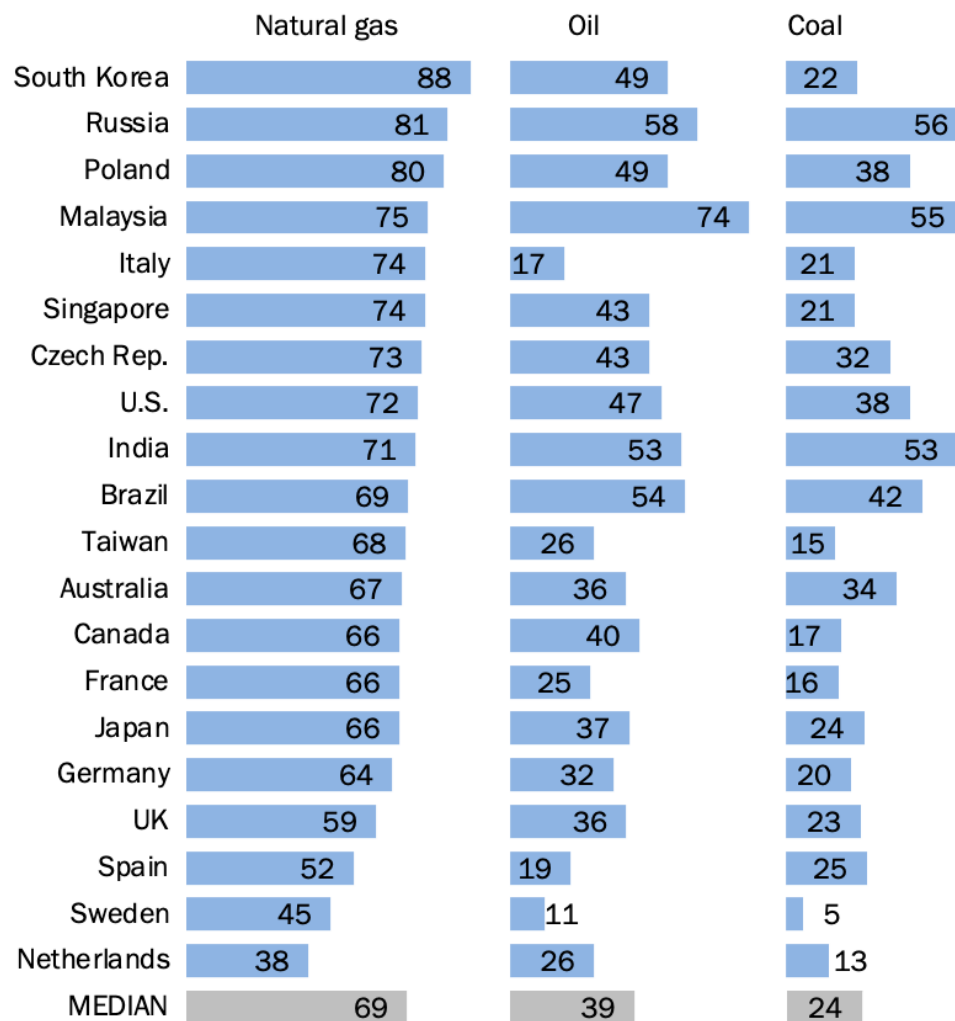
Abundance-Energy Security

- 100+ years of secure natural gas resource



Majorities support expanding natural gas in most places; far fewer support expanding oil, coal

% who favor expanding each of the following as a source of energy



Note: Respondents who gave other responses or did not give an answer are not shown.

Source: International Science Survey 2019-2020. Q26c, Q26d, Q26f.

"Science and Scientists Held in High Esteem Across Global Publics"

PEW RESEARCH CENTER

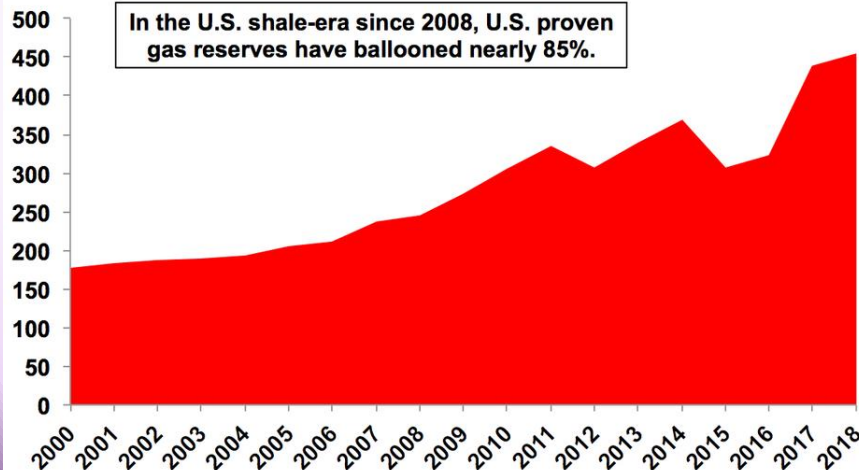


If there are environmental questions about Green Energy...
Why take down our domestic cleaner fuels infrastructure?

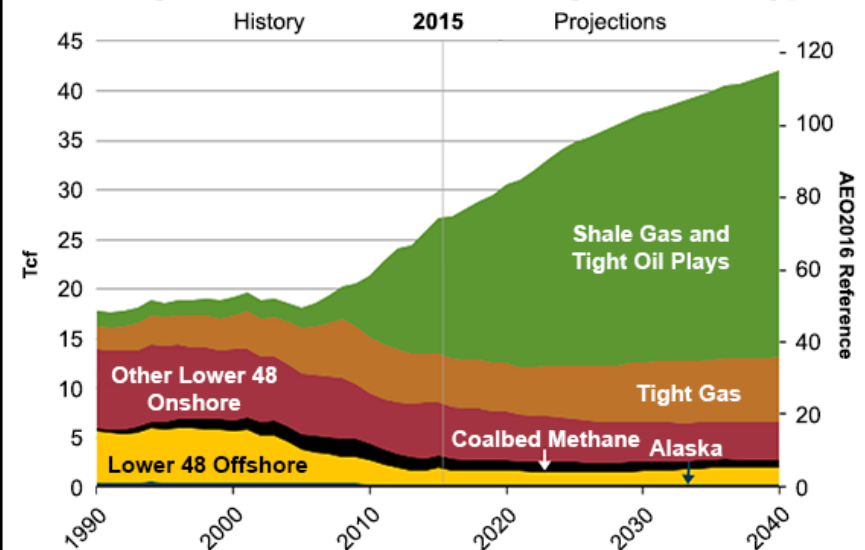


Lots and Lots of
U.S. Natural Gas..
For A Long, Long Time!

U.S. Proven Natural Gas Reserves
Trillion Cubic Feet

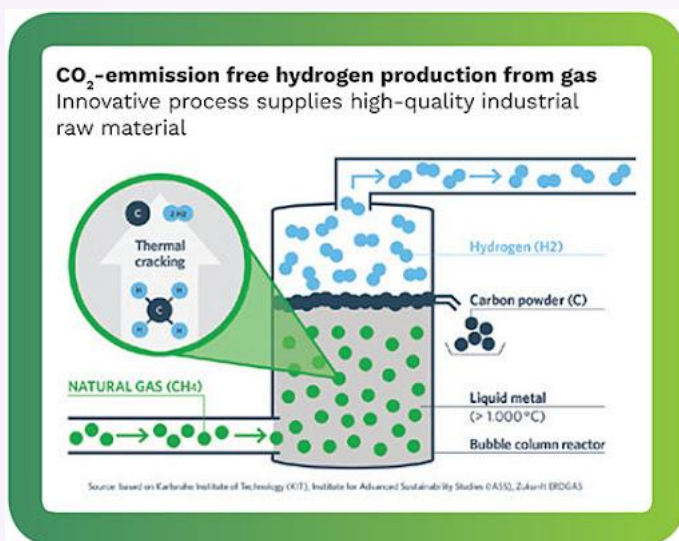
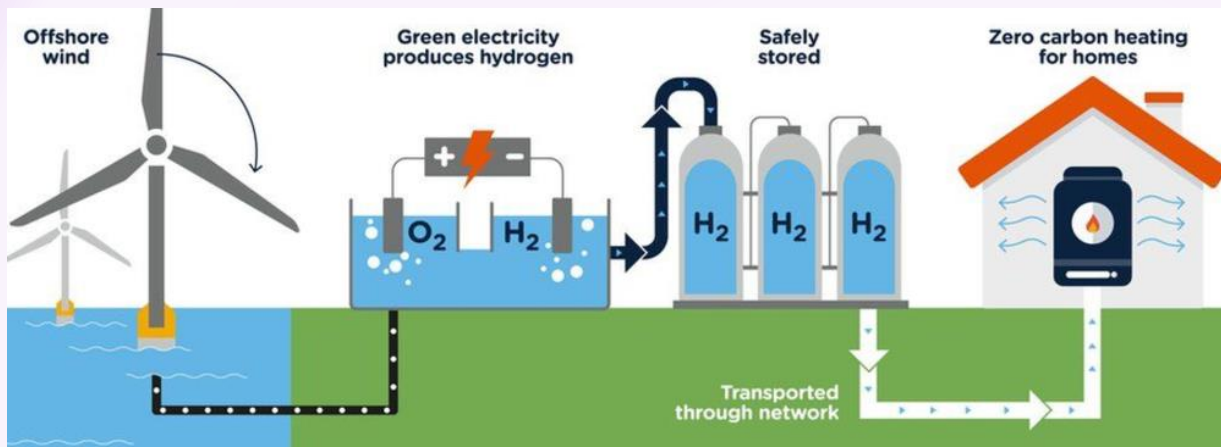


U.S. Dry Natural Gas Production By Resource Type



Source: EIA Annual Energy Outlook 2016

HOW ABOUT GREEN FUELS....FROM NATURAL GAS?



TXNG.ORG

Helping to Fund Renewable
Hydrogen Dispensing Facilities



SOLUTION: GREEN NEW DEAL OR....?



\$100 Trillion!!??

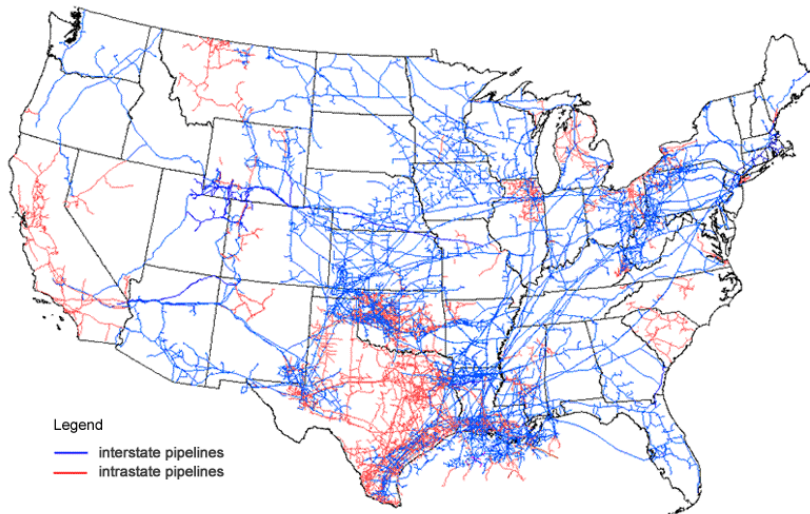
Requires Massive Electrical Grid Expansion
& Lots and Lots of Land....

OR...STAY DOMESTIC

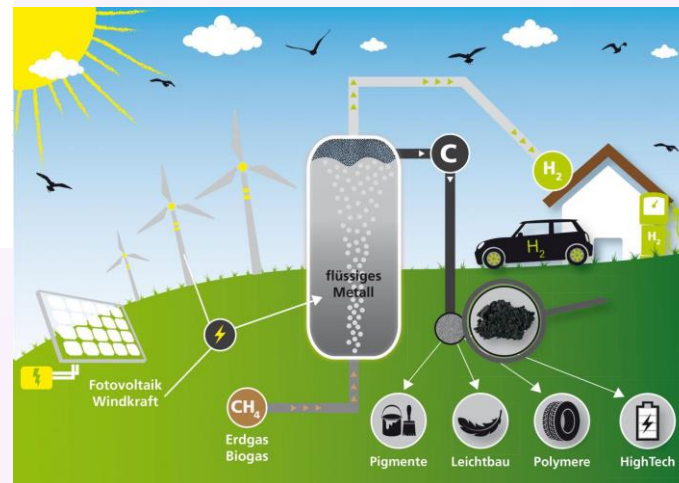
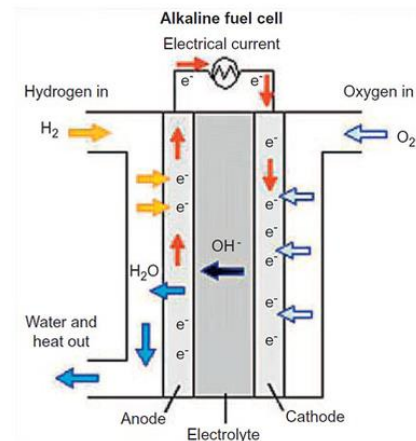
Research and Develop H₂ Fuel Cells from NG?

Modify our Current Pipeline System for Green Fuels?

Map of U.S. interstate and intrastate natural gas pipelines



Source: U.S. Energy Information Administration, About U.S. Natural Gas Pipelines



Our Real Energy Dilemma

3 Laws of Energy (Thermodynamics)—The Good, The Bad & The Ugly

There is No Free Energy—Always a Price

With Any Energy Use -There is Always Waste/Pollution

Oh...And You Must Use Energy

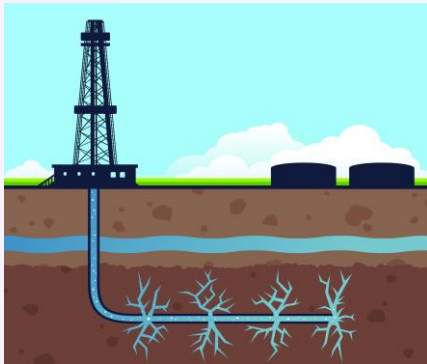
The 4 no 5 F's of Our Energy-Pick Your Poison



Foreign Oil

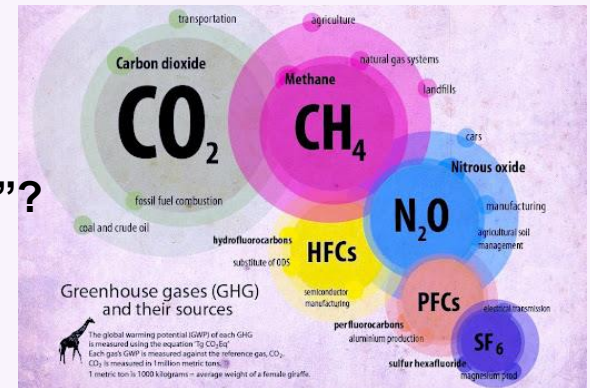


Fukushima



Fracking

“Not Green” vs “So-Called Green”?

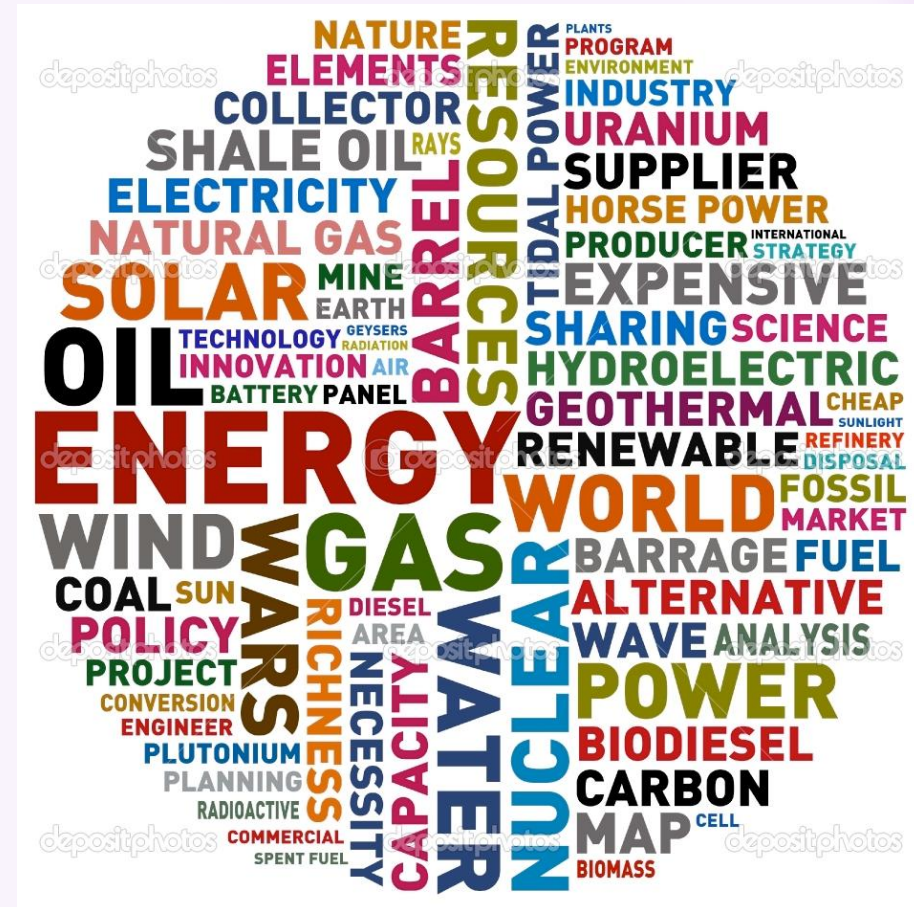


“All Freaking Green”- house Gases!



“Filthy” Rare Earths!!

Global Sellers-Buyers



Develop Our Domestic Energy Base...Don't Be An Energy Buyer

An Energy Strategy Update

“It isn’t Rocket Science”

- Strengthen Energy Infrastructure—Both Pipelines & GRID
- Carbon Capture And Reuse Research (CO₂ Recycling)
- Find Domestic Substitutes For Rare Earth Minerals
- Develop Better Energy Storage (Batteries & Fuel Cells)
- Invest in Hydrogen Technologies
- Research into Blue & Green Energy Fuels
- Be And Then “Stay” Energy Independent!!!



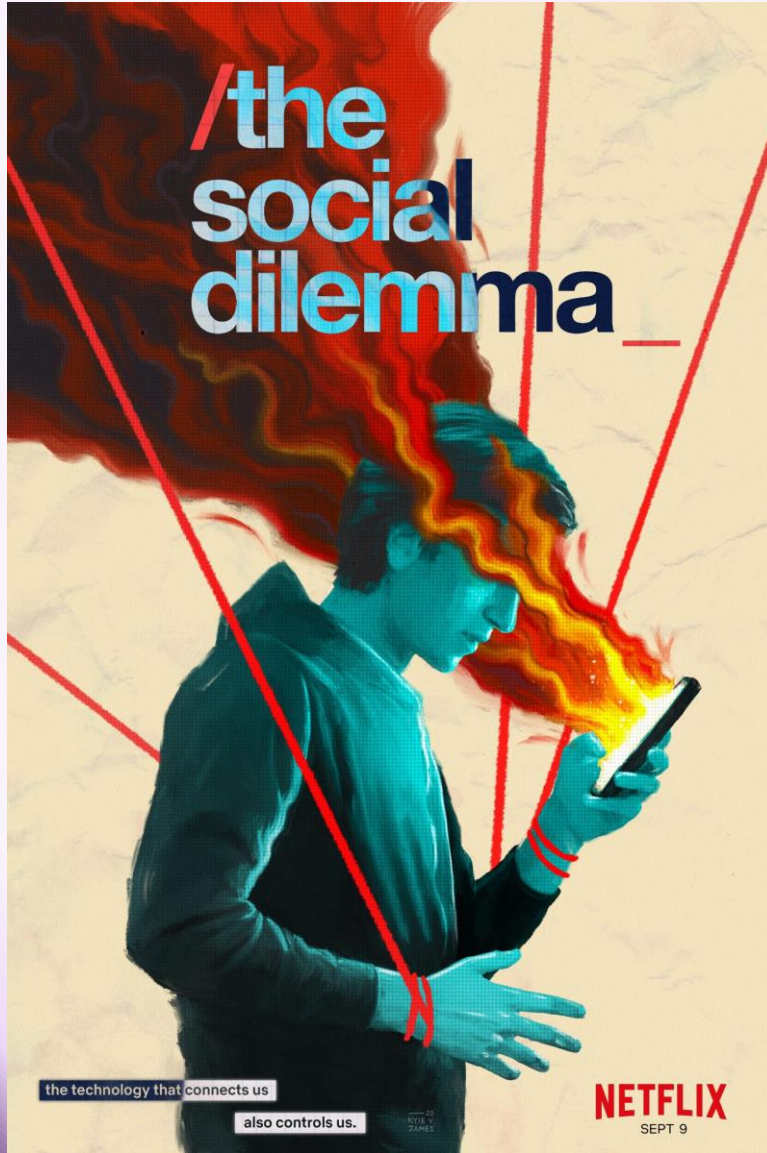
THE TEXAS ISD BUY-IN....A 2021 UPDATE



Fort Worth ISD



NETFLIX DOCUMENTARY: “THE SOCIAL DILEMMA”—A MUST SEE

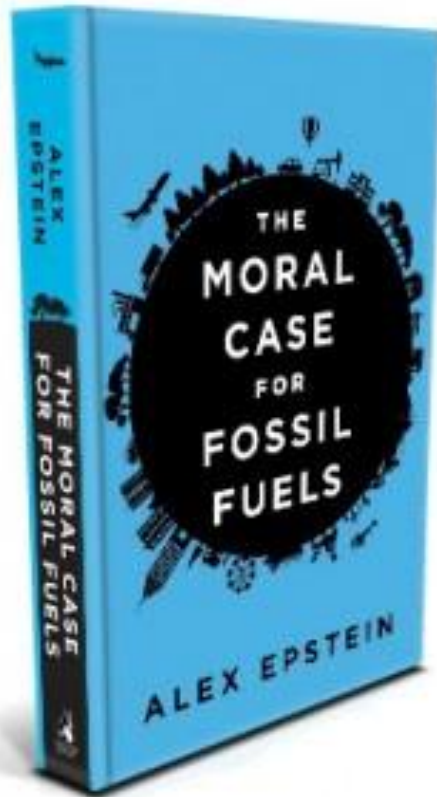


Explains why when my wife was looking at buying a new coffee table on “her” phone....

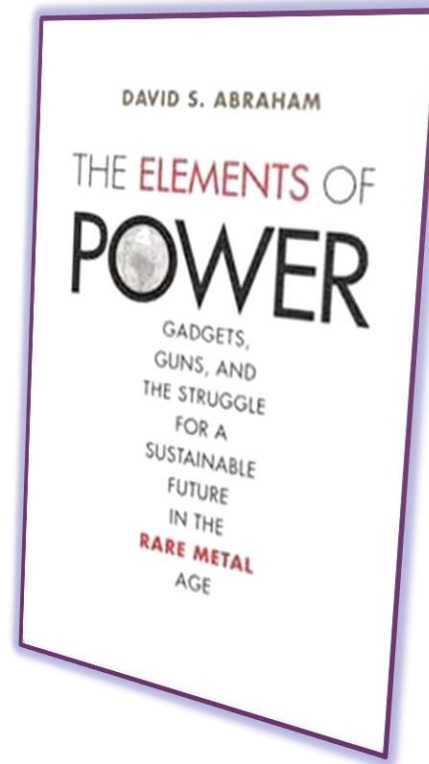
I immediately started getting Facebook promotions about furniture sales of couches, tables & chairs for several days!!



3 Books to Read!!

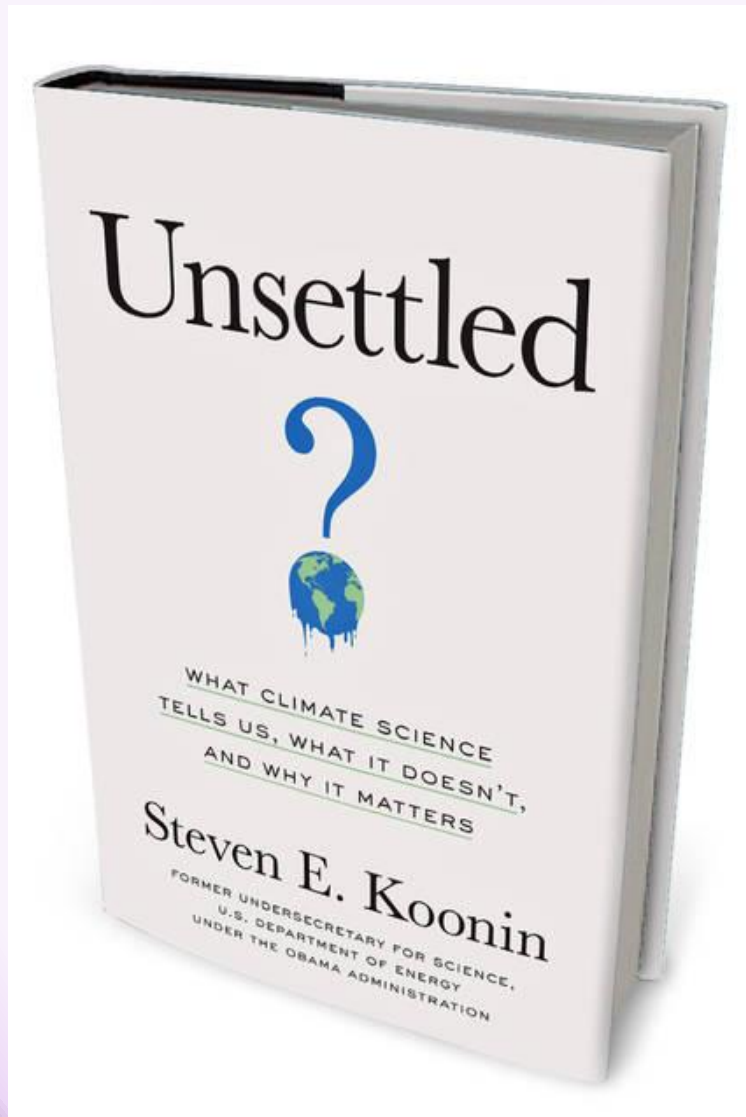


Fossil Fuels



Rare Earths

AND, IF YOU WANT TO REALLY KNOW ABOUT THE CLIMATE CHANGE DEBATE...

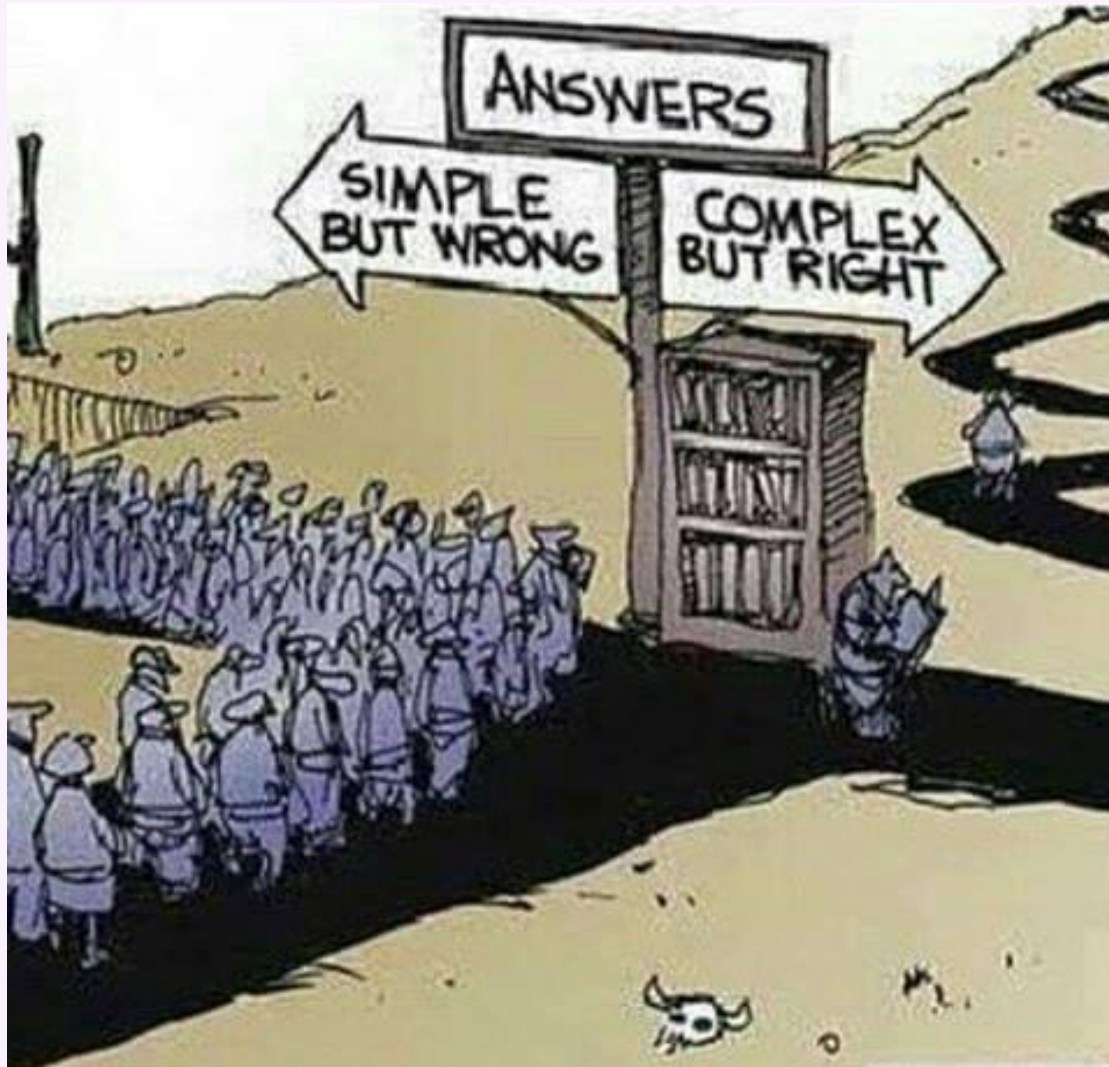


“I have been dismayedby the willingness of some climate scientists—abetted by the media and politicians—to mis-represent what the science says”

Stephen Koonin, Closing Thoughts From His Book...."Unsettled"

It's just as easy
to buy scientists as
it is to buy politicians.





FACTS: WHO DO YOU TRUST??



The M



WHO ARE YOU GOING
TO BELIEVE, ME OR YOUR
OWN EYES?

- GROUCHO MARX



Washington D.C.?



Scientists?

ENERGY AND CLIMATE: WHO CAN WE TRUST

Ken Morgan, Ph.D

k.morgan21@outlook.com

817-845-5451



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