The Unpopular and Hard Truths of Coal Power

The Lifeblood of the U.S.A.

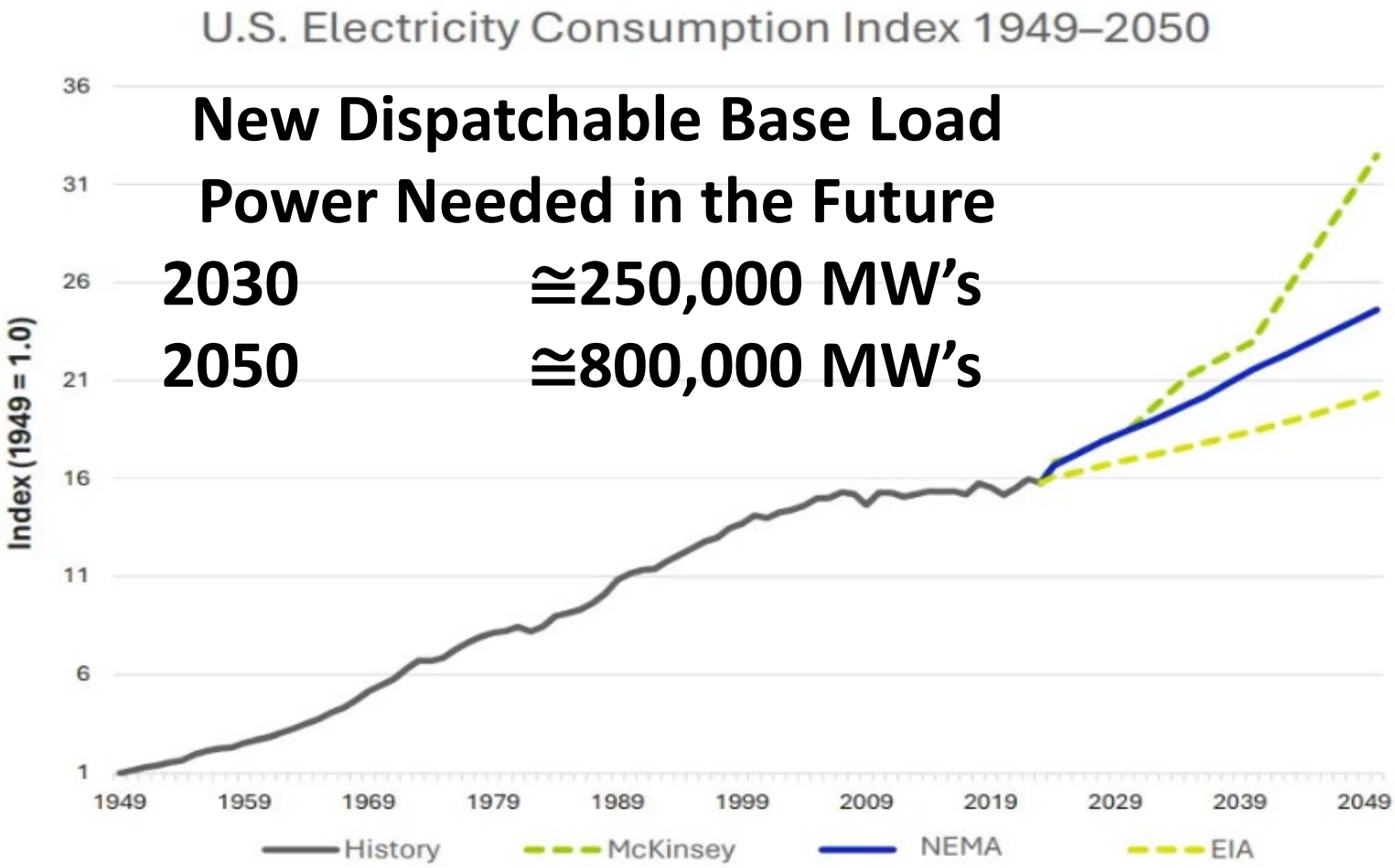
THE COAL INSTITUTE

by

Dick Storm

Storm Technologies

Electricity Growth Forecast to 2050

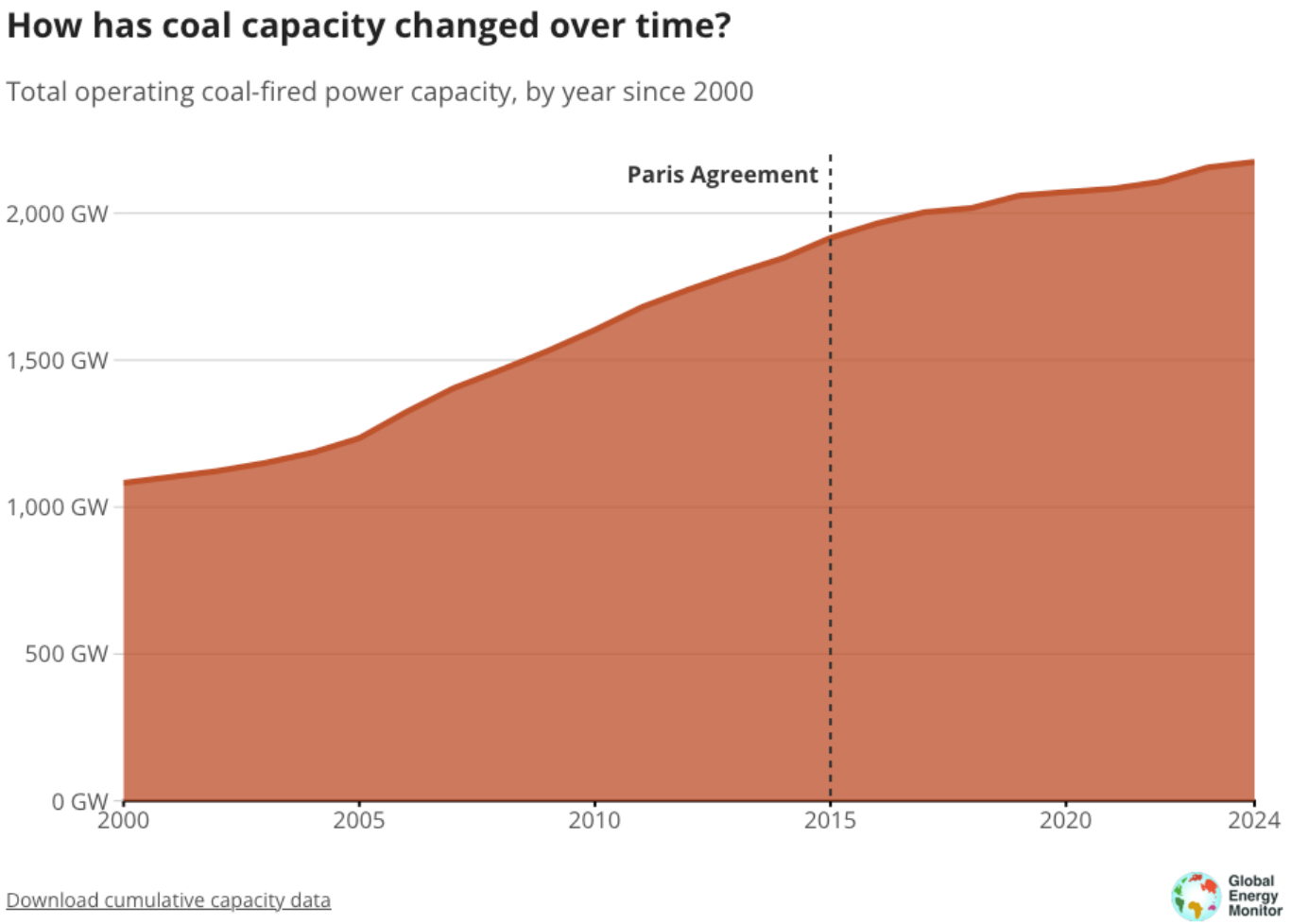


New Dispatchable Base Load Power Needed in the Future

2030 ≅250,000 MW's

2050 ≅800,000 MW's

Coal as the #1 Source of Primary Energy Use for Electricity Generation is Growing Worldwide



What were we doing in America up until Jan. 20, 2025?

"Decarbonize by Electrifying Everything", according to MSM

Electricity: The Life-Blood of America

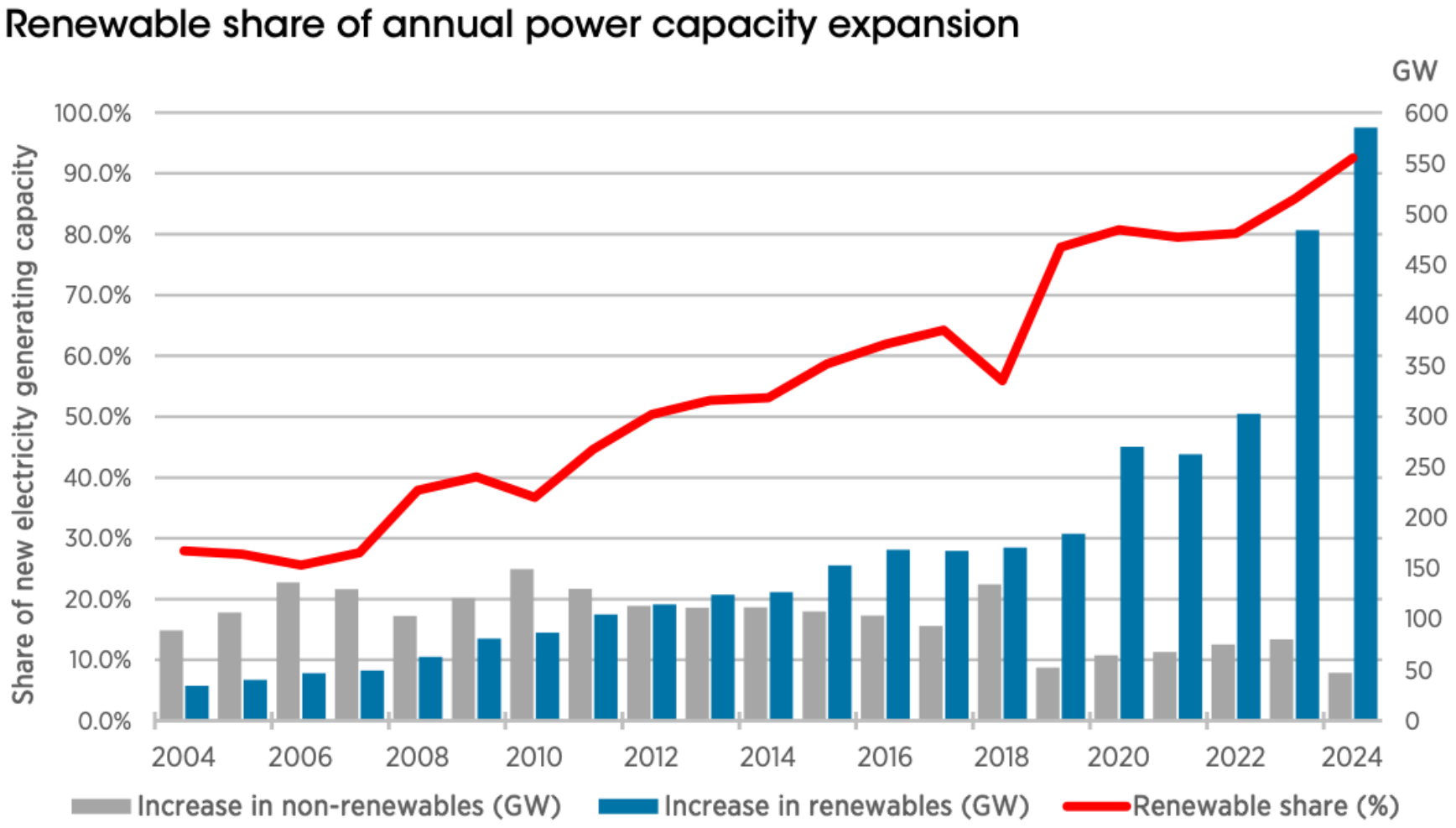
Jules Verne's Captain Nemo in the novel, "20 Thousand Leagues Under the Sea".....

"There is a powerful agent, obedient, rapid, easy, which conforms to every use and reigns supreme on board my vessel. Everything is done by means of it. It lights it, warms it, and is the soul of of my mechanical apparatus. This agent is electricity." In 1870, it was science fiction. Today, it is reality. Electricity is in fact, the Life-Blood of America

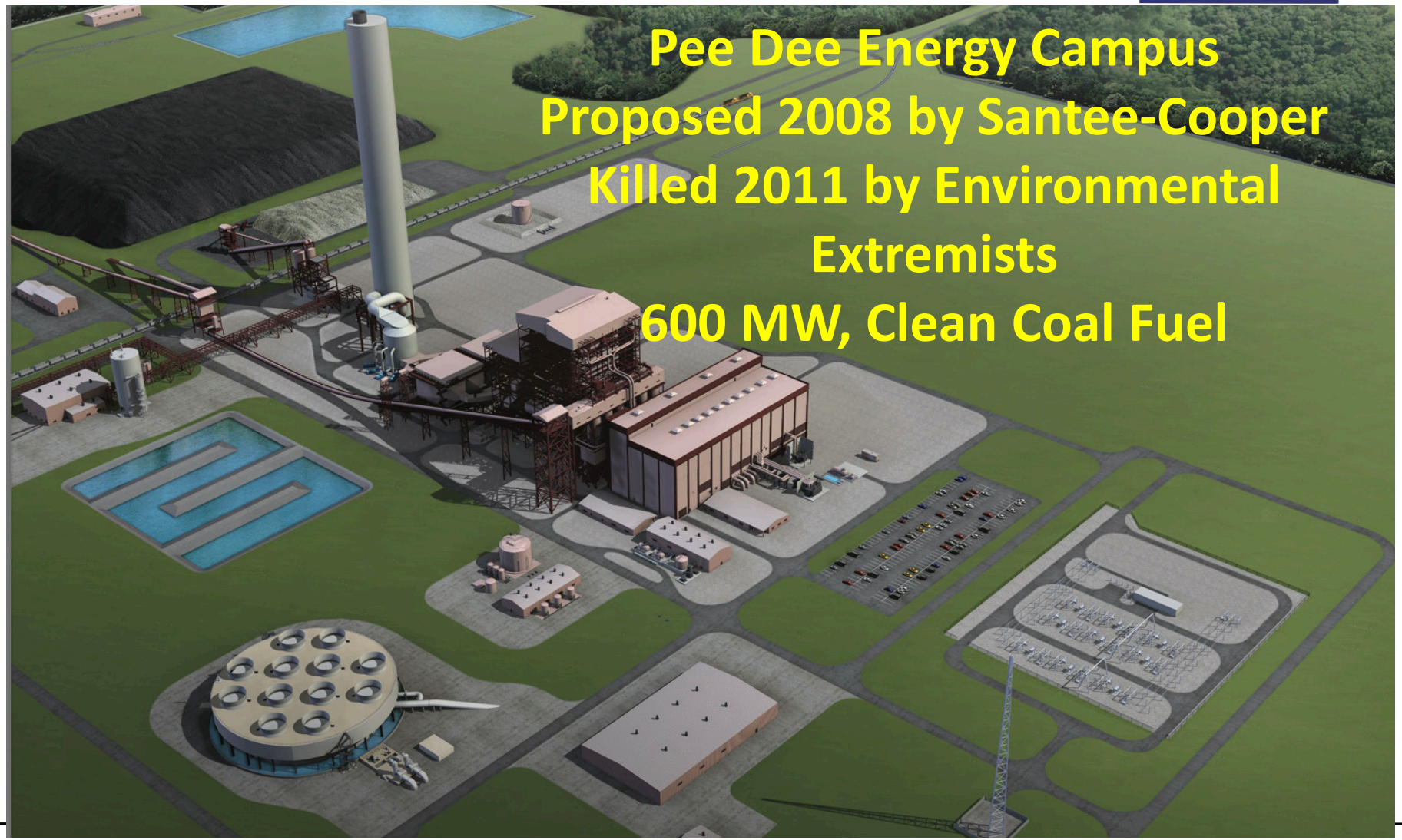
The Self-Inflicted Electricity Generation Crisis

- **DEI and ESG**
- **Public Indoctrination**
- **"Woke" Utility Exec's**
- **Misguided Politicians**

Over 90% of Capital Investment for New Power Generation in 2024 was Wind & Solar



America Needs More New Generation Capacity Additions, Like the Canceled 600 MW Pee Dee Plant



More Solar and Wind = High Electricity Costs

50%+ Coal

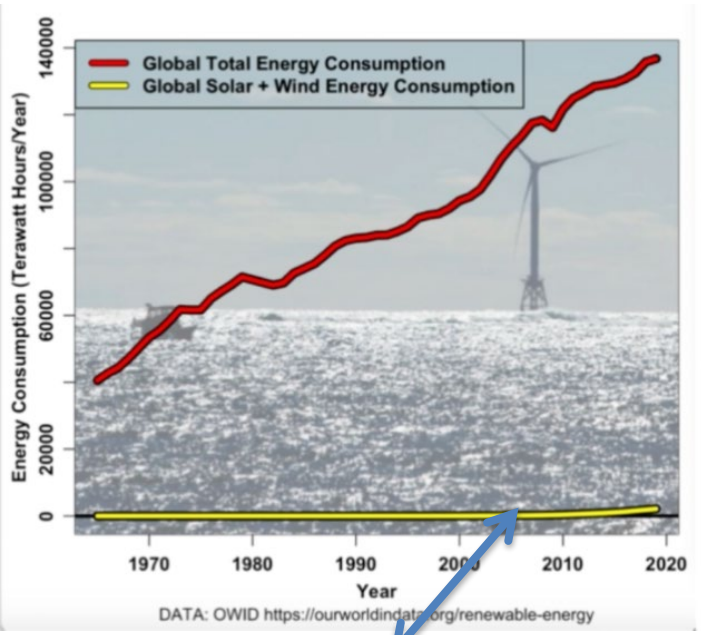
ND.	$0.1169
UT.	$0.1252
WY.	$0.1305
WVA	$0.1604
MT.	$0.1233
MO.	$0.1283

Near 0% Coal

HI	$0.4244
CA.	$0.3177
CT.	$0.3228
MA.	$0.3065
RI	$0.2889

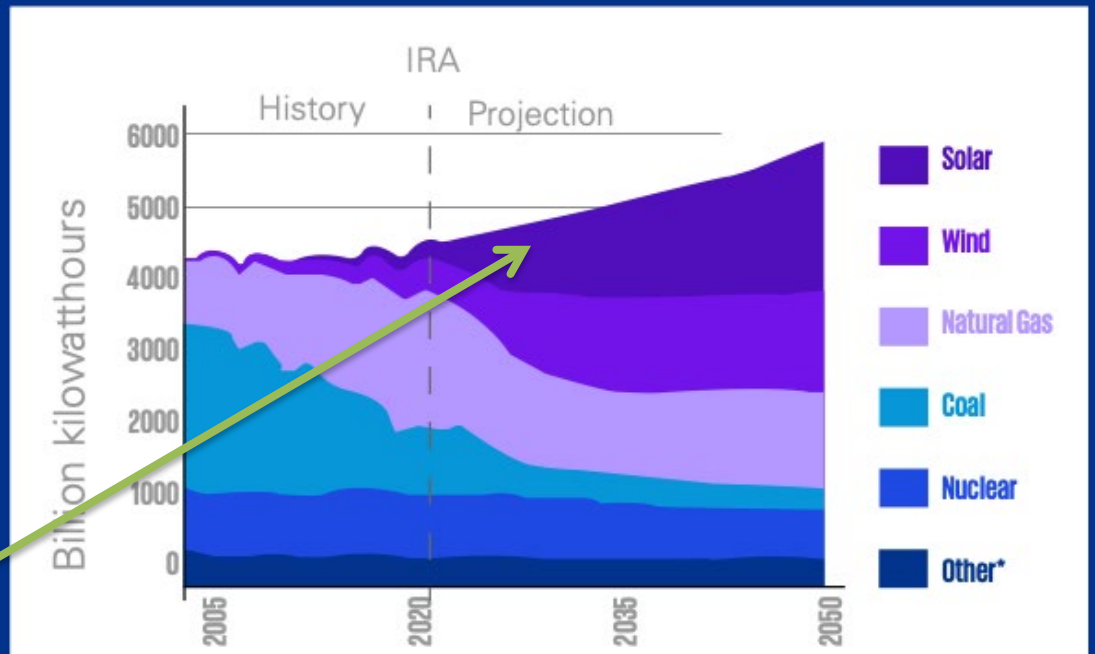
https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a

Wind + Solar= Less than 2% of World's Primary Energy



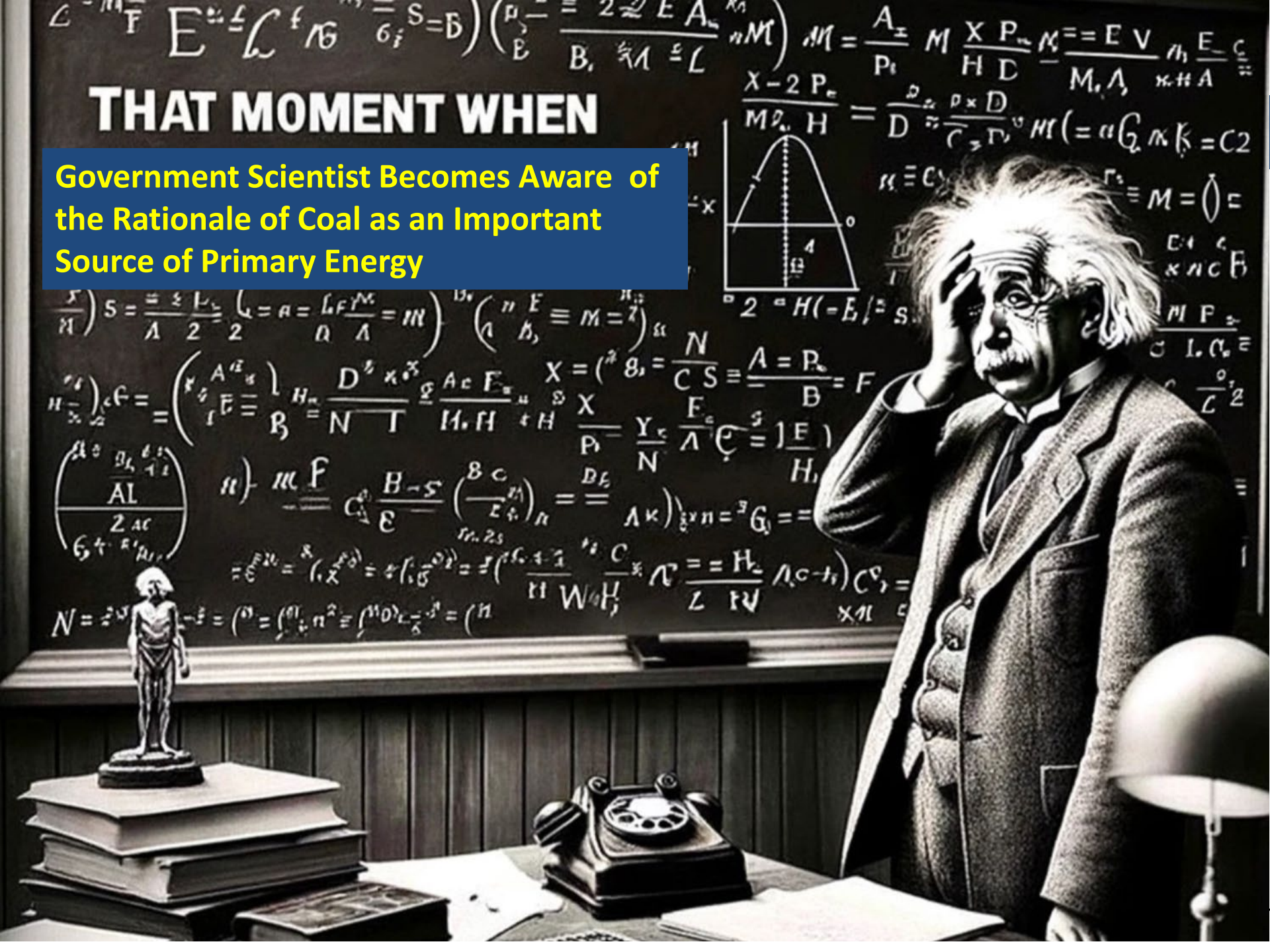
US net electricity generation by fuel source

The majority of US electricity generation will come from solar and wind by 2050



Newtonian Physics (Reality)

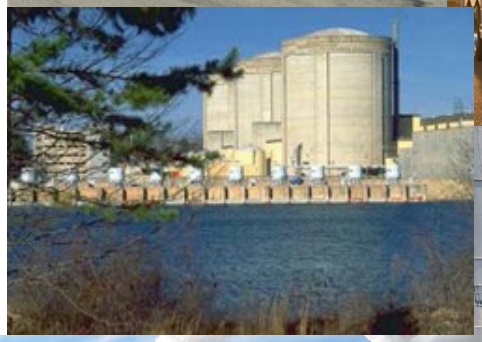
Green "Hopium" Physics


THAT MOMENT WHEN
Government Scientist Becomes Aware of the Rationale of Coal as an Important Source of Primary Energy

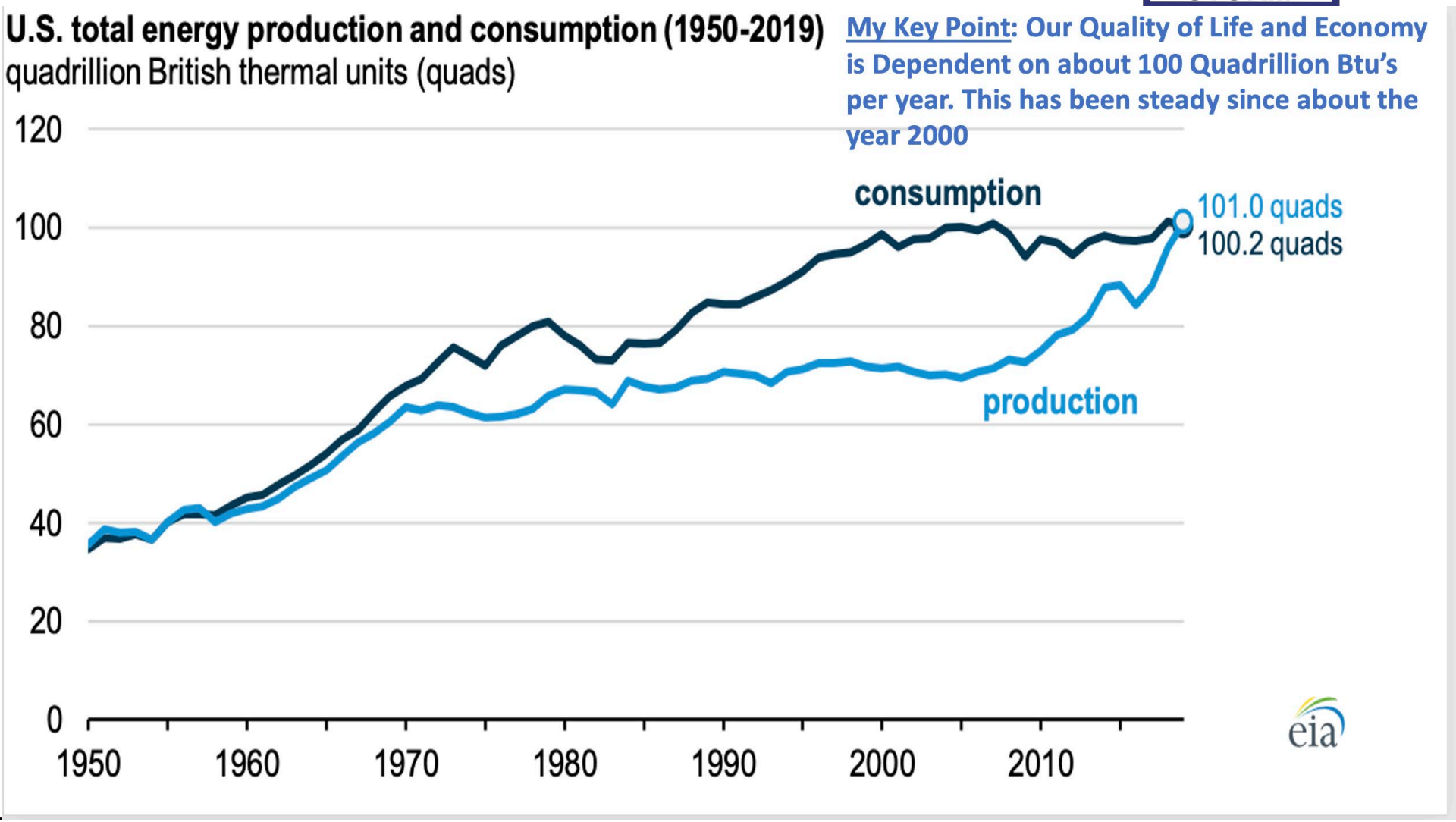
90% of the Primary Energy we use is from Conventional Sources

- **Petroleum 35%**
- **Natural Gas 33%**
- **Coal 10%**
- **Nuclear 8%**
- **Hydroelectric (Dams over 70 years Old) 4%**

Total 90%



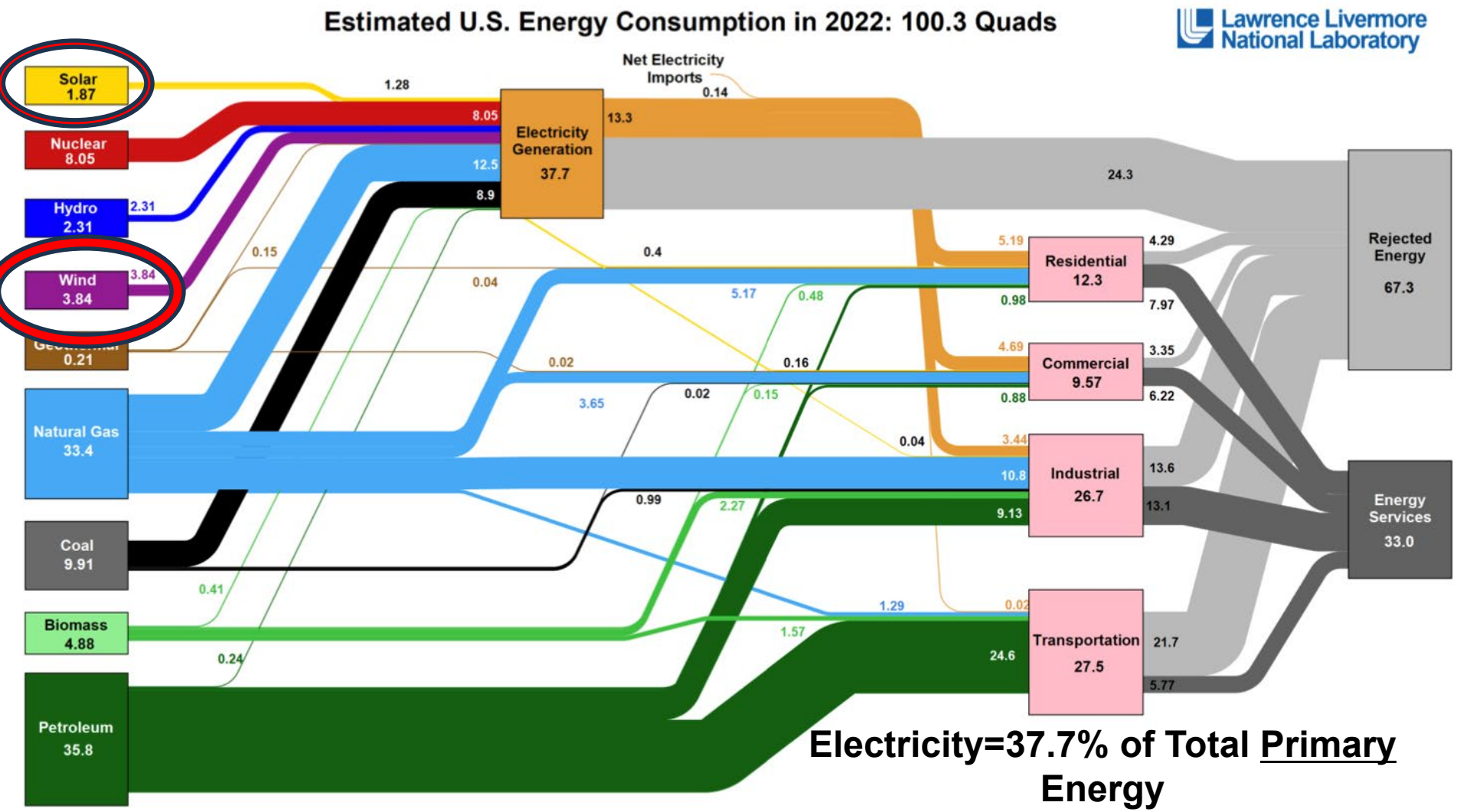
America Runs on About 100 Quads of Energy



Solar + Wind= Less than 6% of Total Primary Energy

STORM
SERVICE QUALITY RESULTS

Lawrence Livermore National Laboratory



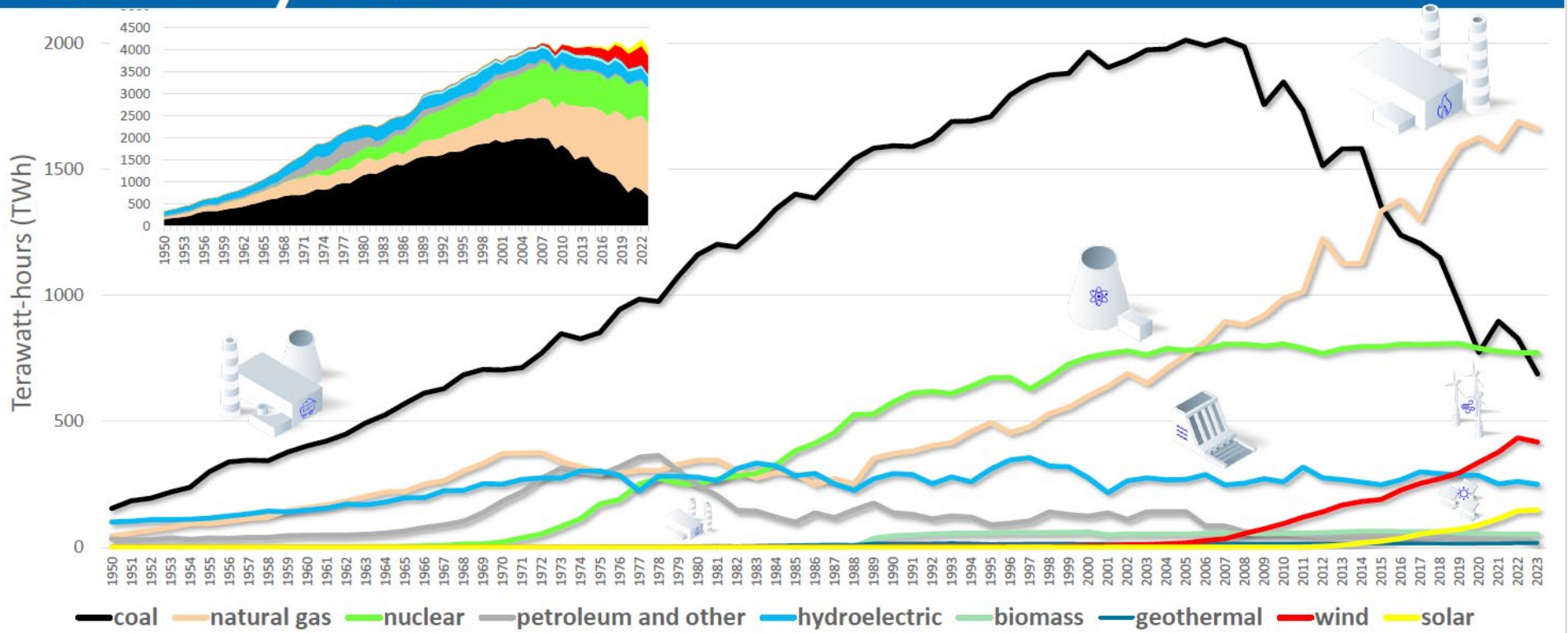
Electricity=37.7% of Total Primary Energy

Solar + Wind= 5.71% of Primary Energy

Coal has lost #1 Fuel Position to Natural Gas

US Electricity Generation last 70+ years …

The Energy Transition

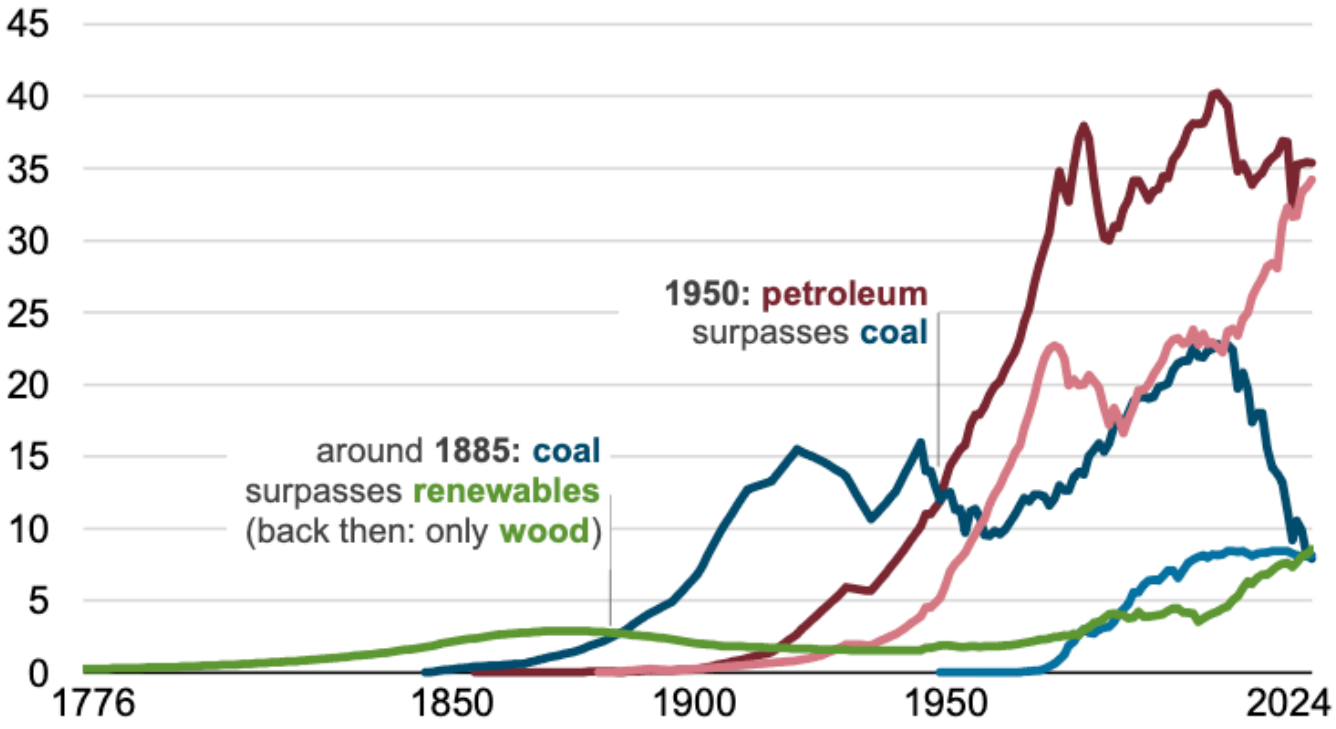


Gas is the leading electricity energy supply

Electricity Demand Peaks & Dispatchable Gen

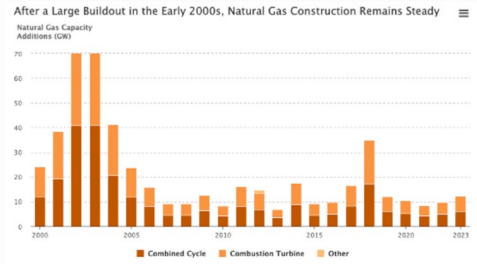
How has U.S. energy use changed since 1776?

U.S. energy consumption (1776–2024)
quadrillion British thermal units



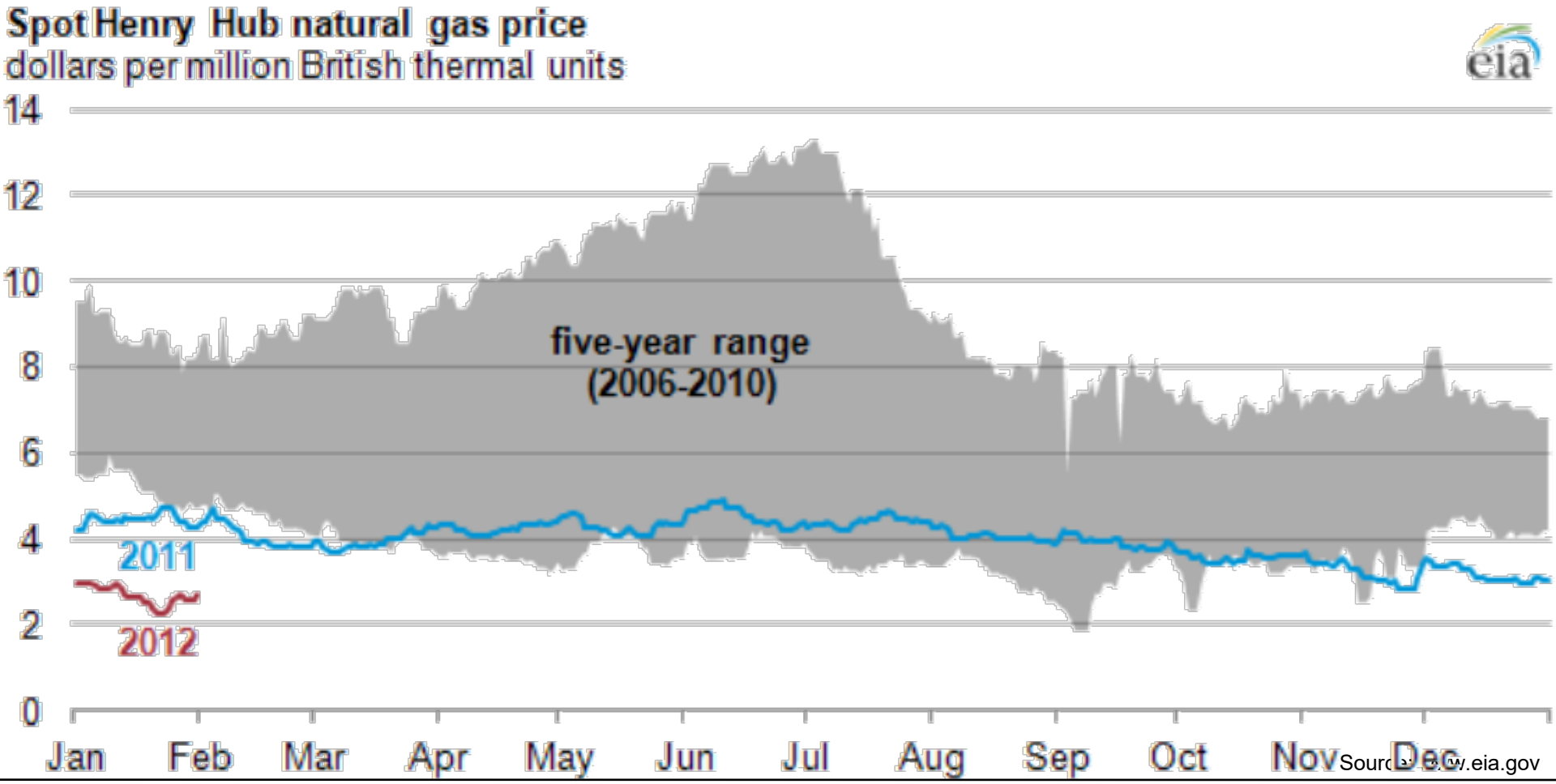
energy source (2024 percentage of total)

petroleum (38%)
natural gas (36%)
renewables (9%)
nuclear (9%)
coal (8%)

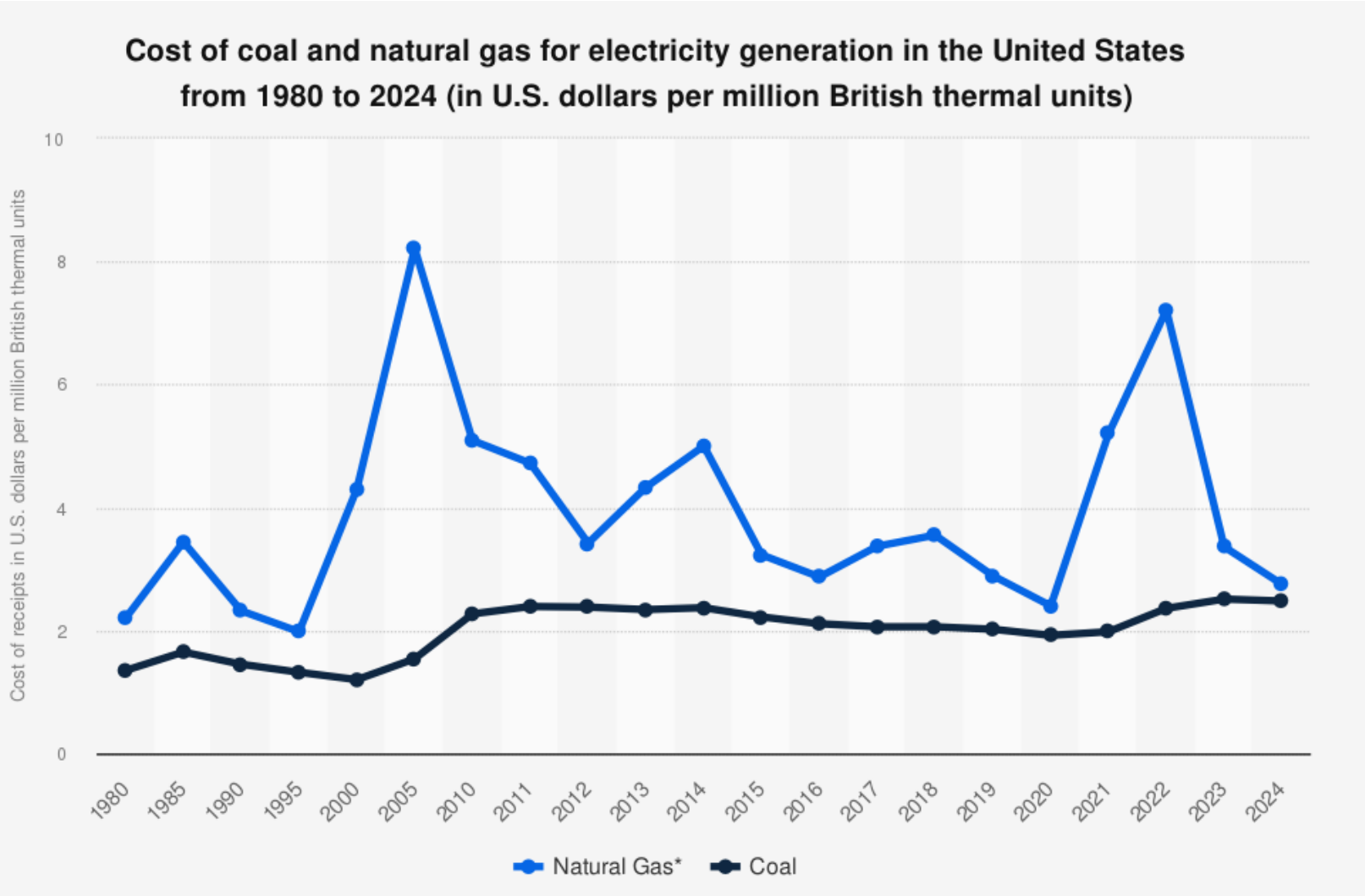


Data source: U.S. Energy Information Administration, *Monthly Energy Review*
Data values: Primary Energy Consumption by Source and Estimated primary energy consumption in the United States, selec

2006-2010 Natural Gas Prices Peaked
5 Year Range….Future $/mmB Not Certain
Balanced Generation Portfolio is Preferred



Comparison of Coal & Natural Gas Prices 1980-2024



Natural Gas Plants ≅ 45% of U.S. Electricity

IRP Generation: Two Neighboring Utilities

Assessment of Resource Need

santee cooper

Figure 9. Projected Supply v. Demand Balance (Base Case)

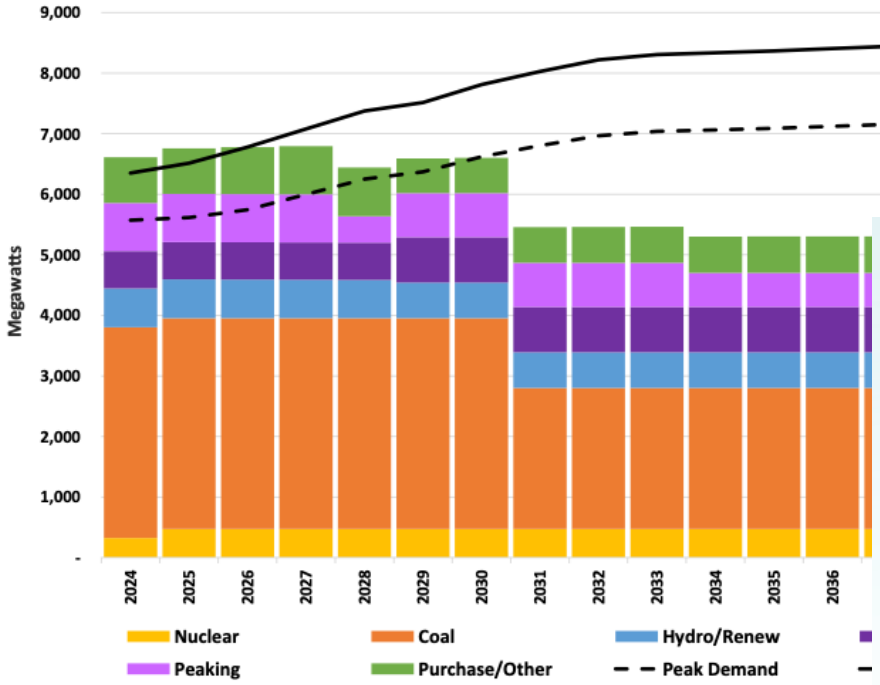
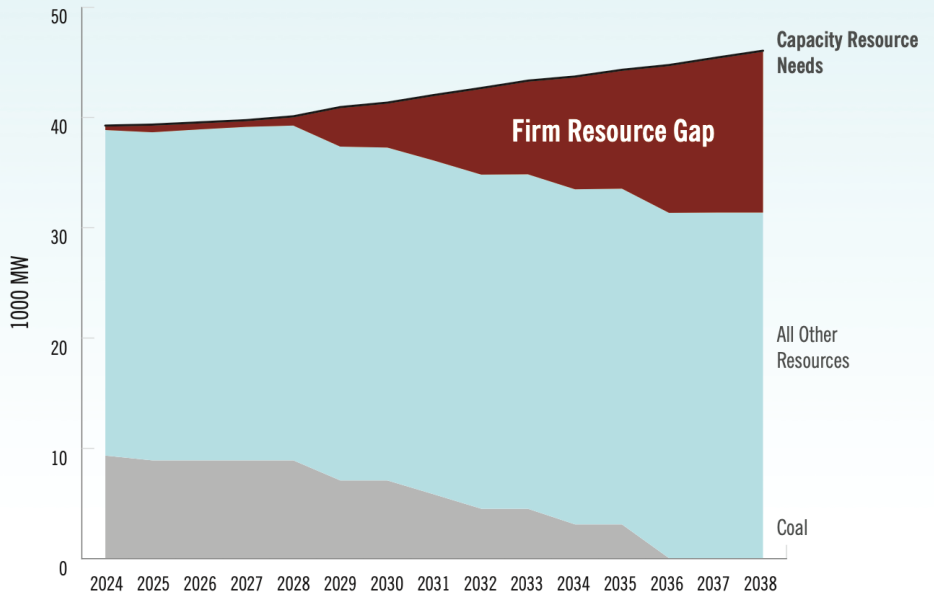


Figure 3: DEC and DEP Joint Winter Capacity Resource Needs



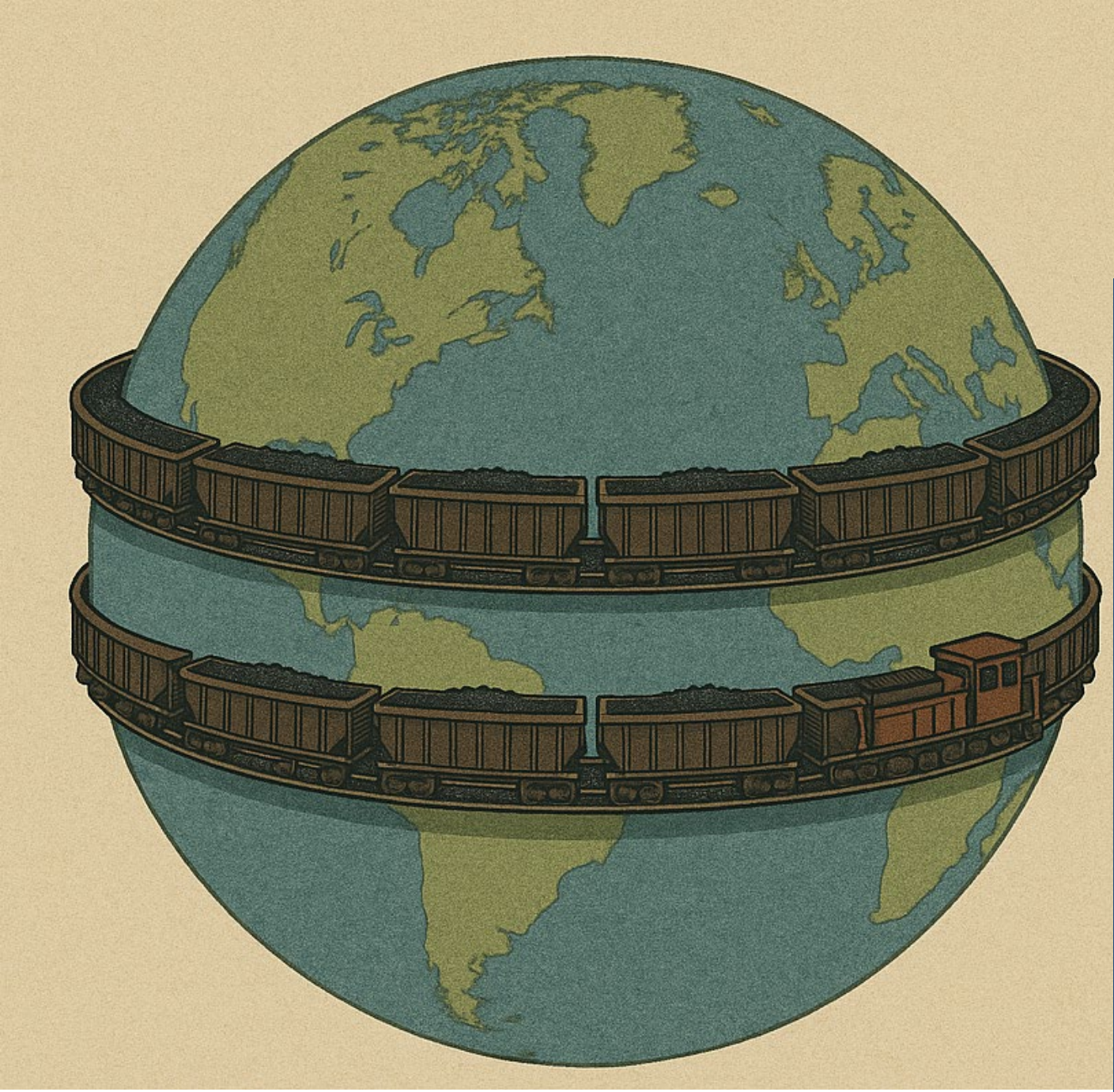
The Enormity of 100+ Quadrillion Primary Energy Btus…

- 100 Quadrillion 100,000,000,000,000,000. (15 zeroes after 100)
- 94.3% of this Primary Energy is Provided by Conventional Fuels of Natural Gas, Gasoline, Diesel, Jet Fuel, Nuclear, Coal & Old Hydroelectric Plants
- 79% of the Primary Energy we need and use is provided by the Fossil Fuels Gasoline, Diesel, Jet Fuel & Coal
- Each day Americans consume about 370 million gallons of gasoline for transportation not including Diesel and Jet Fuel
- In 2022 Americans consumed 135 Billion gallons of gasoline
- Now….Imagine what 135 Billion 1 gallon gasoline cans lined up would look like
- If 135 Billion 1 gallon gasoline cans were lined up, end to end, They would be about 21,212,121 miles long. Long enough to circle the earth 848 times or travel to the moon 88 times

PRIMARY Energy Use expected in 2050: ≅130 Quads

The length of the coal car, coupling to coupling is about 55 feet. The heat content of 100 tons of western Powder River Basin coal at 9,000 BTU's per pound is about 1,800 million Btus per coal car. Dividing 1,800 million Btus into 10 Quadrillion results in a train of coal cars about 52,083 miles long. Long enough to circle the earth two times. That is just the coal used in the U.S.A. in 2022

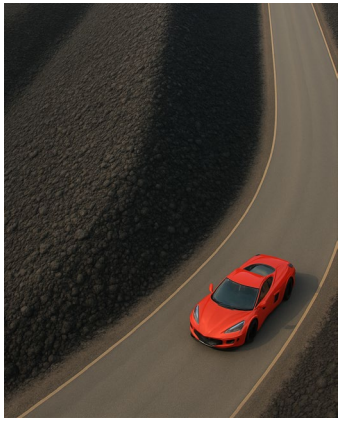
10 Quadrillion Btus of coal for electricity generation in the U.S. the coal would fill a train that would circle the earth two times. Just as a matter of reference, the amount of coal used in China is more than ten times the coal consumed in the U.S.A.



10 Quadrillion BTU

A Coal Train 52,400 miles long wrapping around the earth two times is equivalent to 10 Quadrillion BTUs

So, How Large is one Quadrillion BTU of Coal?



1 Quadrillion BTUs of Coal

Coal pile 3.3 miles long, 1 mile wide and 10 feet deep.
Imagine a race- track around the coal storage pile.

A Corvette travelling 60 Mph. It would take about 9 minutes for the car to make a lap around a pile of one Quadrillion BTUs of coal

1 Quadrillion BTUs of Coal

Coal pile 3.3 miles long, 1 mile wide and 10 feet deep. Imagine a race- track around the coal storage pile.

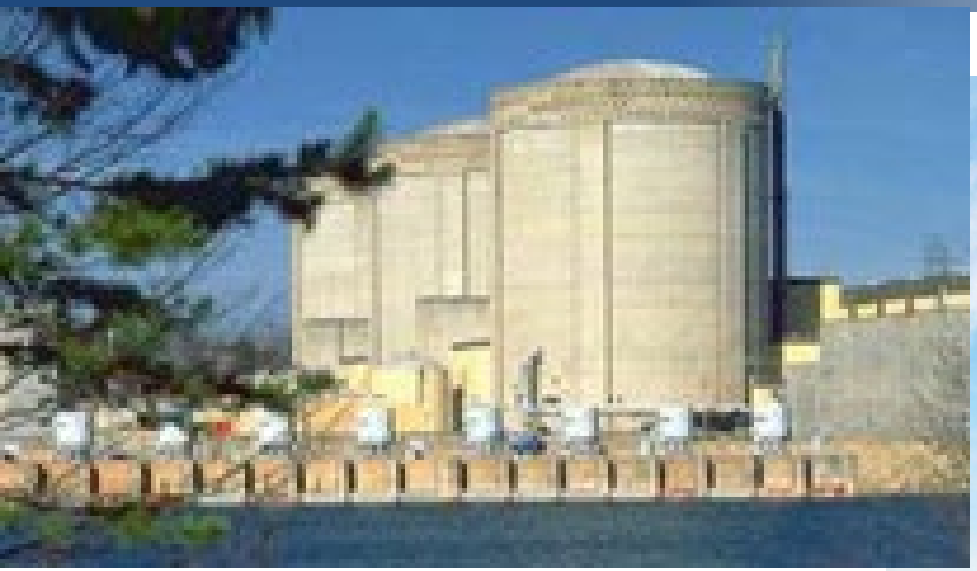
A Corvette travelling 60 Mph. It would take about 9 minutes for the car to make a lap around one Quadrillion BTUs of coal

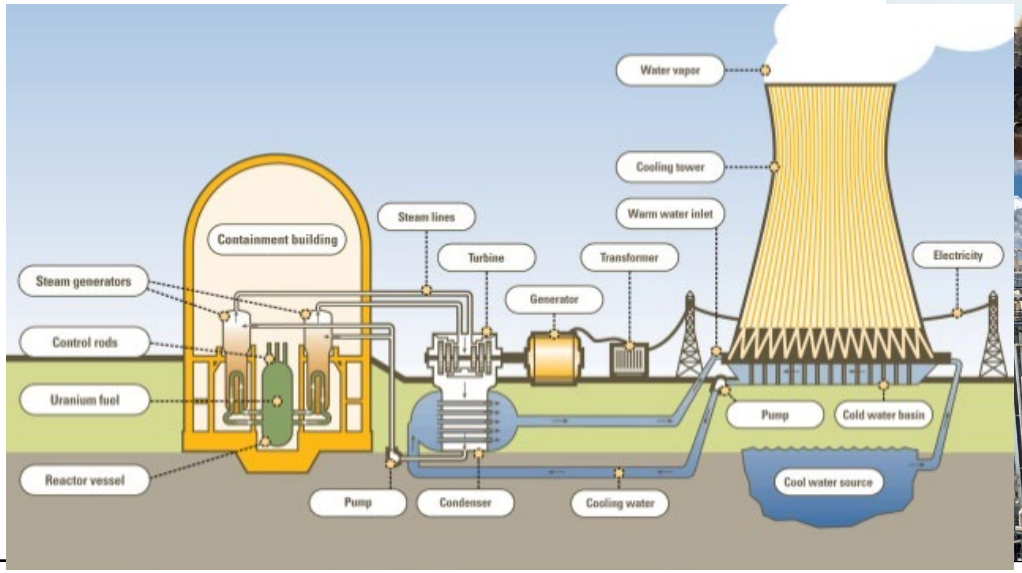
Visualize 33 Quadrillion BTUs of Natural Gas, Imagine LNG Tankers such as the one shown below. That would be a line of 6,000 ships, each 950 feet long, placed in a line, stem to stern touching, they would reach over 1,070 miles. A continuous line of ships from just south of Philadelphia in the Delaware Bay would reach to Miami. This would represent the quantity of natural gas, stored in super dense liquid form used in one year. This line of ships would be equivalent to the natural gas burned in the U.S. in 2022.

SERVICE QUALITY RESULTS
STORM

33 Quadrillion BTUs of Natural Gas, if in LNG form would fill 6000 ships, each 905 feet long, touching stem to stern from the Delaware Bay to Miami, about 1,070 miles

South Carolina's Electric Power Generation





Balanced Generation Portfolio is Best

How About New Nuclear Plants

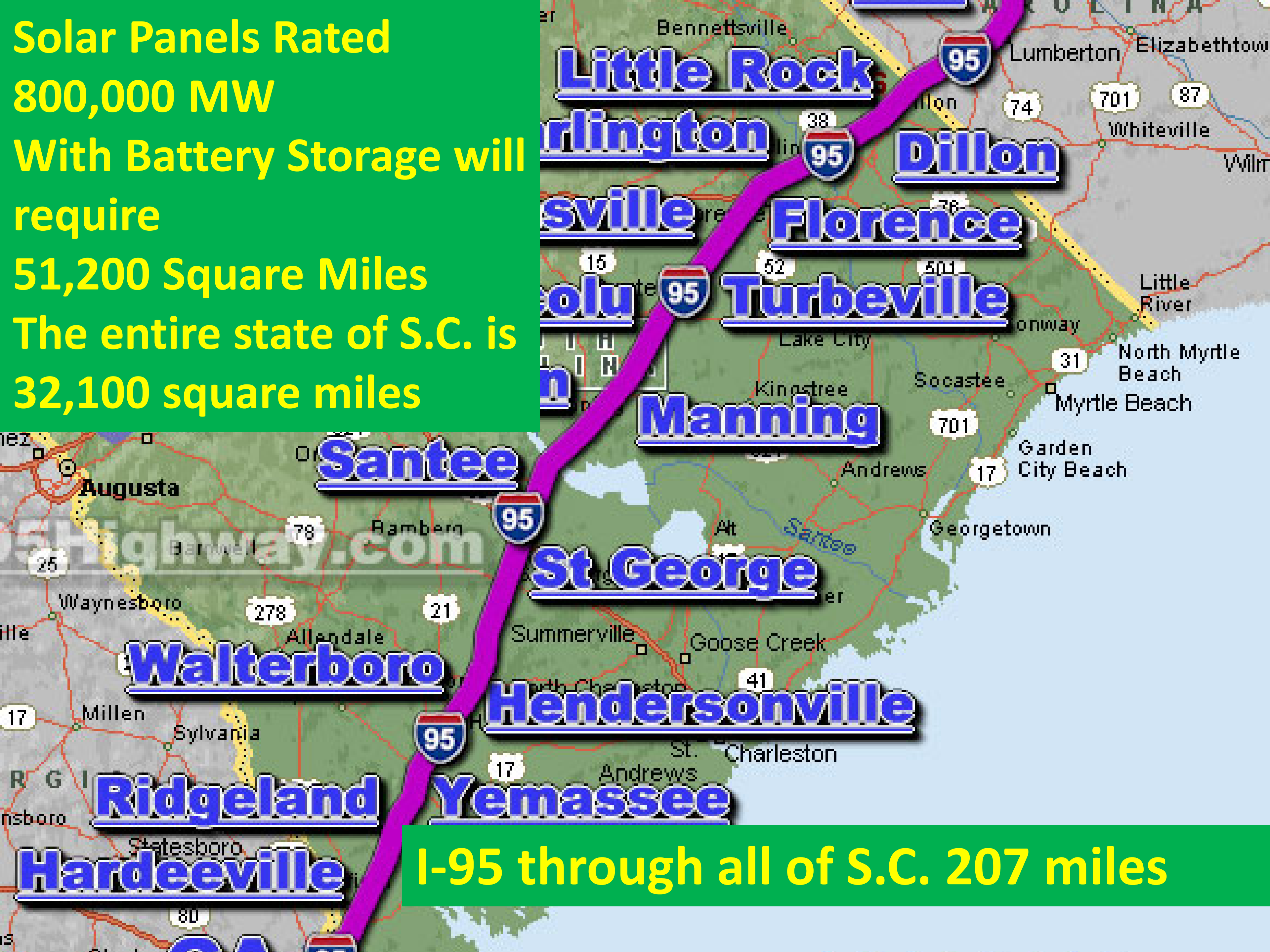
800,000 MW by 2050- What will it take?

- New Nuclear like Vogtle 3&4 building 14/year — 360 new plants
- New 100 MW SMR's building 320/year — 8,000 new plants

Note: Existing nuclear fleet is 94 operating units, about 97,000 MW and it took 30 years to design, construct and refine maintenance practices to achieve the great performance & reliability of today

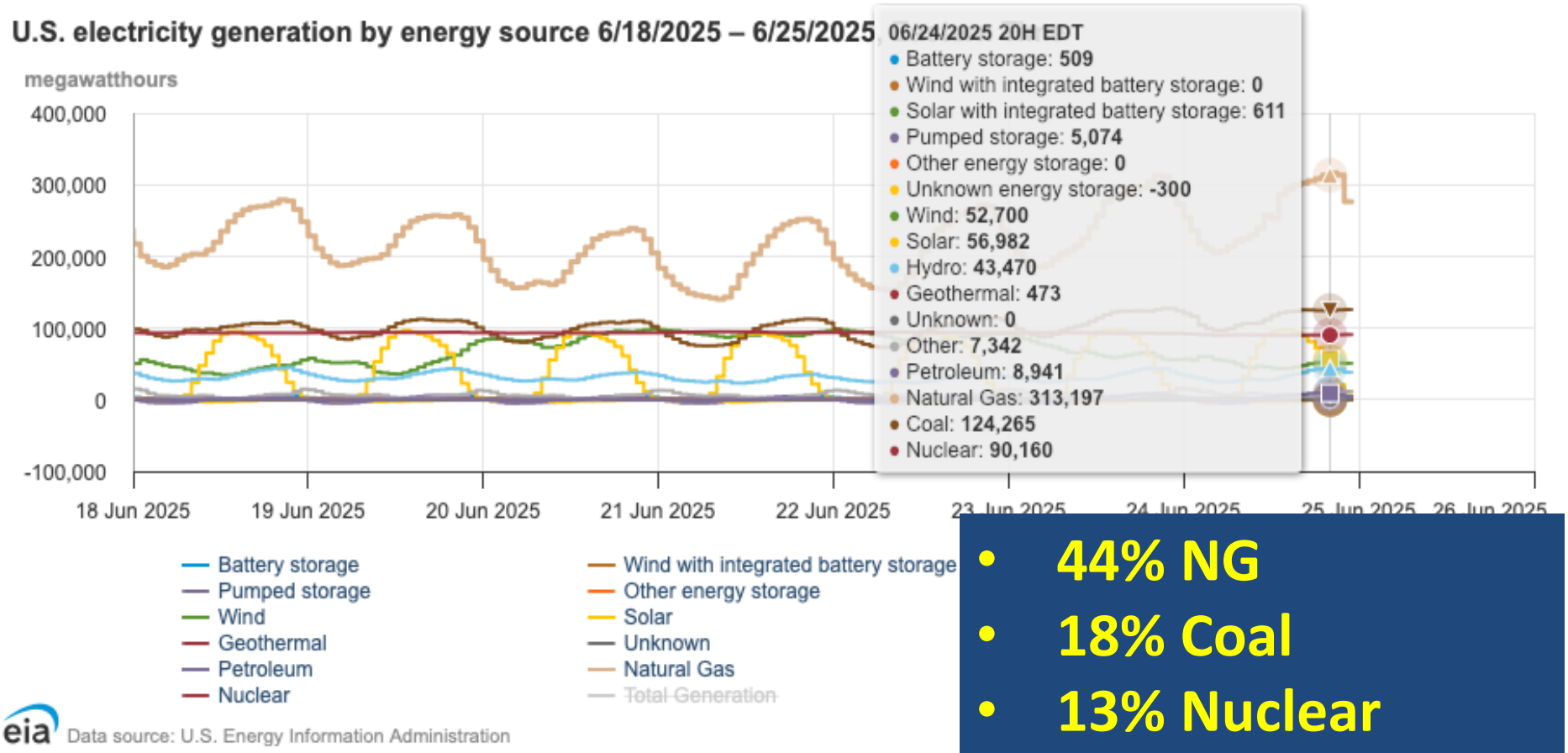
2,500 MW of Solar Requires about 40-160 Square Miles Non-Dispatchable, Intermittent Electricity Generation

Solar Panels Rated
800,000 MW
With Battery Storage will require
51,200 Square Miles
The entire state of S.C. is
32,100 square miles



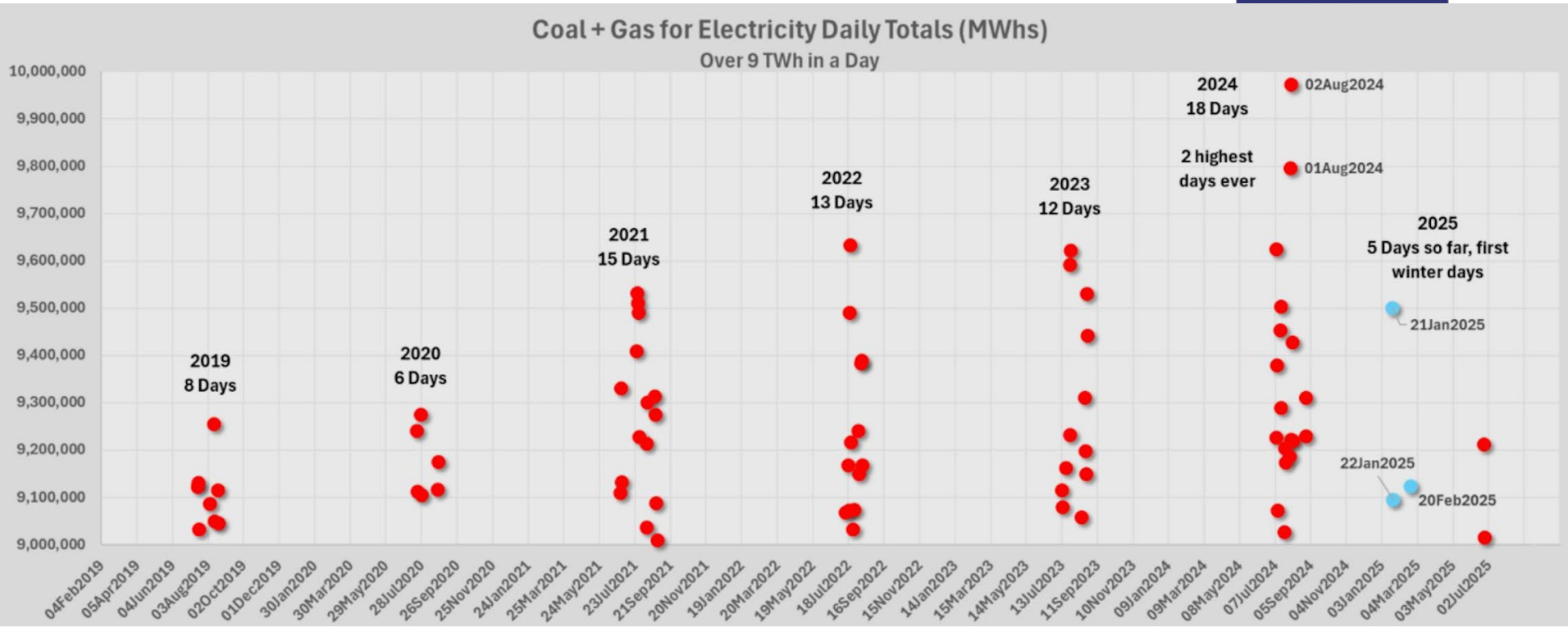
I-95 through all of S.C. 207 miles

Actual U.S. Grid Generation by Fuel June 25th, 2025 (Total Generation =704,113 MW)



- 44% NG
- 18% Coal
- 13% Nuclear
- 23% Renewables

Total Coal + Gas Generation Over 9 TWh in a day



Data from https://lnkd.in/e9DcWKk From Mike Caravaggio post on LinkedIn. Mike is VP at EPRI

Just looking at coal and gas use for electricity on a daily basis for the US Lower 48. The chart looks at days where coal+gas produced over 9 TWh (9,000,000

MWh).

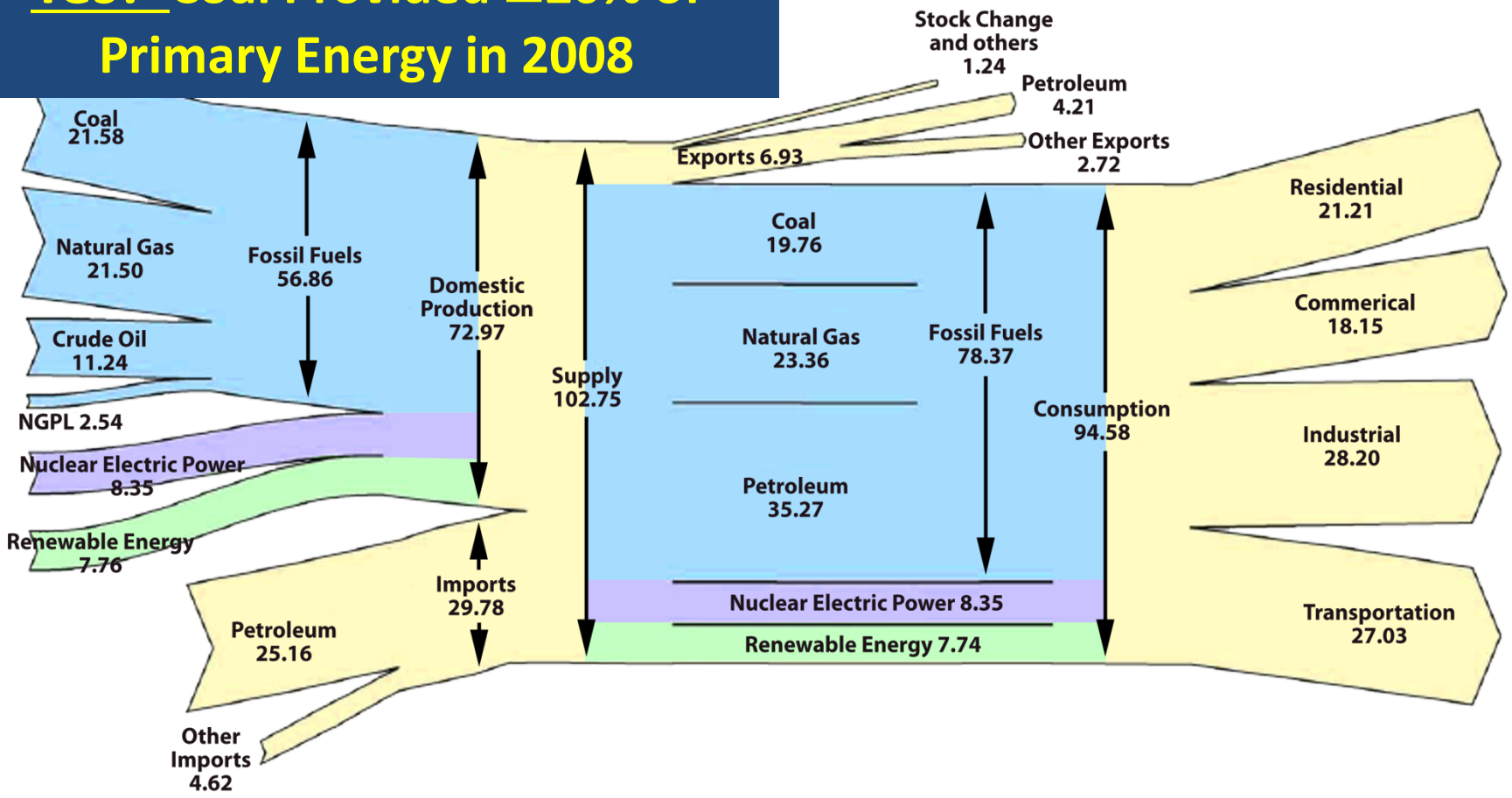
The peak daily reliance on coal+gas has been going up, last year had the two highest days on records. This year was notable with the first days in the dataset (which goes back to the start of 2019) where there were winter days where coal+gas generation exceeded 9 TWh.

Roxboro Generating Station

Generating Capacity About 2462 MW

Double Coal Generation Capacity? Really? Is it Feasible?

Yes! Coal Provided ≅20% of Primary Energy in 2008



10 Reasons why the use of coal should increase in the U.S.A.

1. Proven to be Reliable Electricity generation fuel
2. Proven to be a reasonable and stable cost fuel for power generation
3. On site storage for security and 24/7 reliability
4. Energy independence. America is the Saudi Arabia of coal
5. Clean coal plants can be built with reasonable Regulations in about four years
6. Coal is the only fuel source that can provide the enormous primary energy needed to meet the peak electricity generation forecasted for the next decade
7. Until about 200,000 MW of new nuclear electricity generation capacity is built, coal is the most viable source to provide this surge in needed new electricity generation. New nuclear plants will take decades to be built in sufficient capacity
8. Keeping America competitive with China and the rest of the world requires reliable, affordable electricity. Coal is the most available and proven fuel source to generate the power to reshore American Manufacturing
9. Reliable power in the winter is most reliably provided by coal and/or nuclear
10. There is already too much dependence on natural gas fuel and increasing generation capacity in the near term is difficult due to supply-chain limitations

Dick Storm's "Perfect World Scenario" of a Balanced Generation Portfolio

- 30% Coal Fuel
- 30% Nuclear Fuel
- 30% Natural Gas Fuel
- 5% Hydroelectric
- 5% Wind and Solar

Reliable Electricity

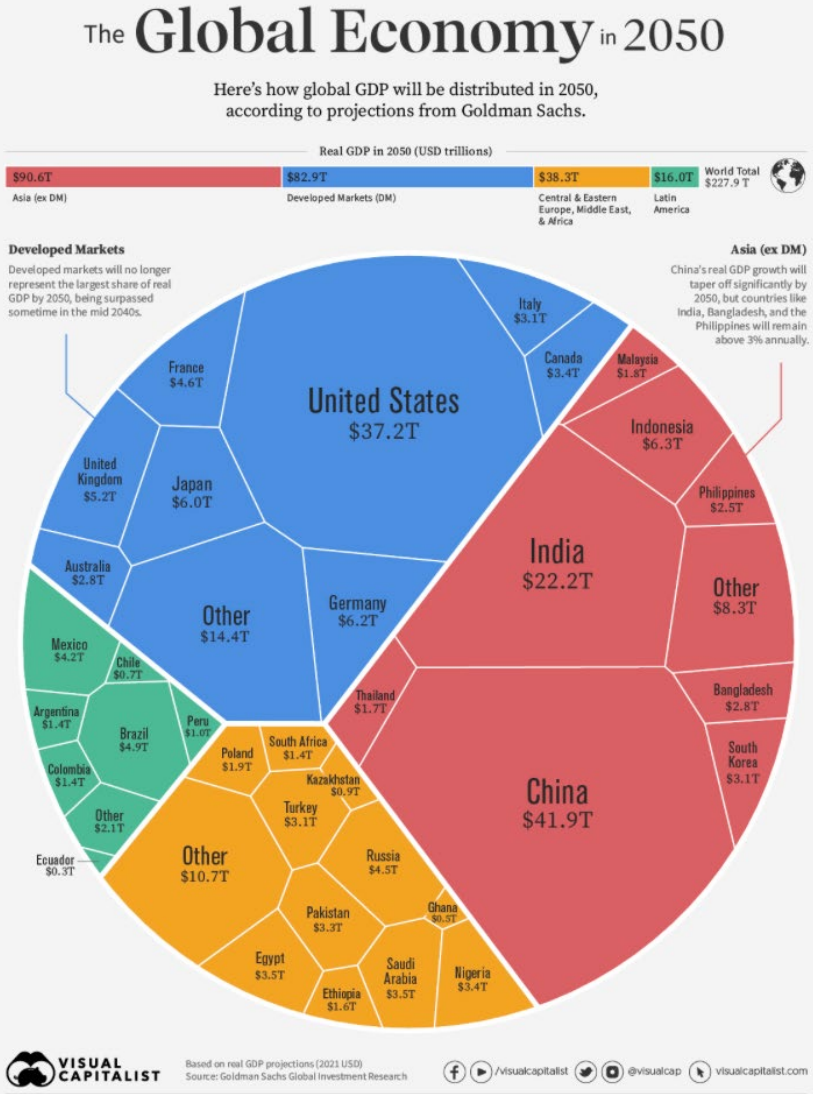
The Life-Blood of America

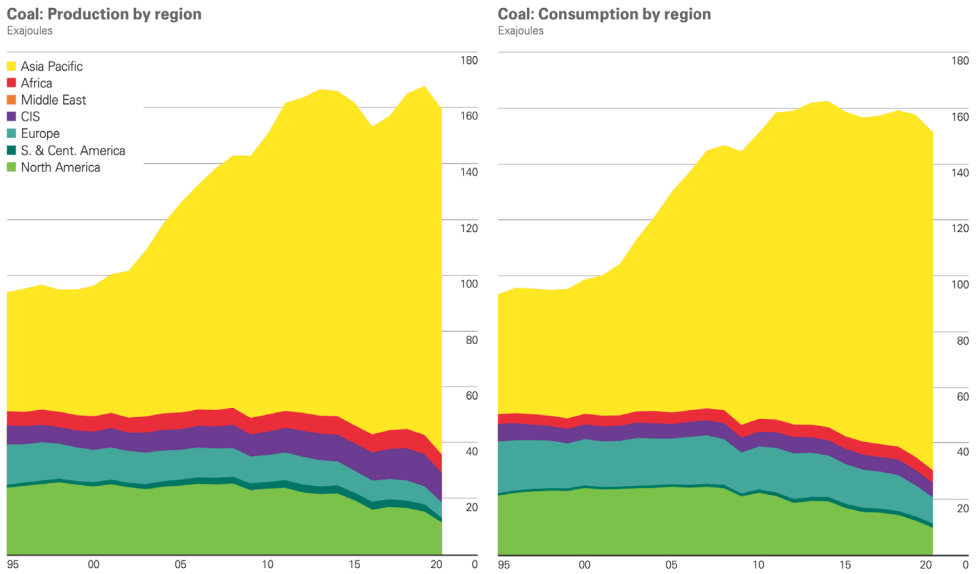
- The Total Generation Capacity to be a minimum of > 115% of Peak Demand

Conclusions and Summary

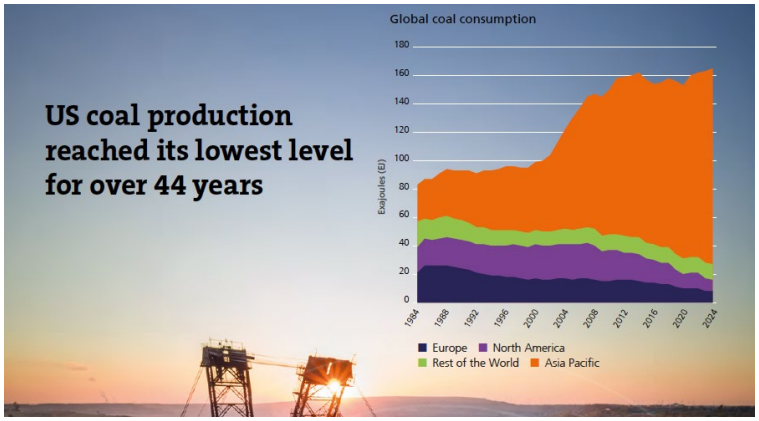
- New Coal Plants Should be Built, at least 125,000 MW
- Coal Primary Energy Supply should be about 20 Quadrillion BTUs and increase to about 1,000,000 tpy as in 2008
- Gas Fueled Power Plants are Maxed Out, Supply-Chain limits new gas turbines to be built by 2030
- Nuclear Plants should be built. However, likely to take at least ten years to build 125,000 MW of new nuclear
- Peak Electricity Growth in 2030-2035 is not likely to be provided by new nuclear, gas or renewables. Coal is the default source of primary energy
- A Balanced Generation Portfolio provides Security both against threats, weather or gas supply price surges

Coal Powers China's Economy





World coal consumption fell by 4.2%, its fourth decline in six years. In the non-OECD, the only notable increases in consumption were in China (0.3%) and Malaysia (18.7%), while significant consumption declines were recorded for India (-6.0%) and Indonesia (-4.9%). OECD demand fell sharply, led by the US (-19.1%) and South Korea



Thank You!

Questions?

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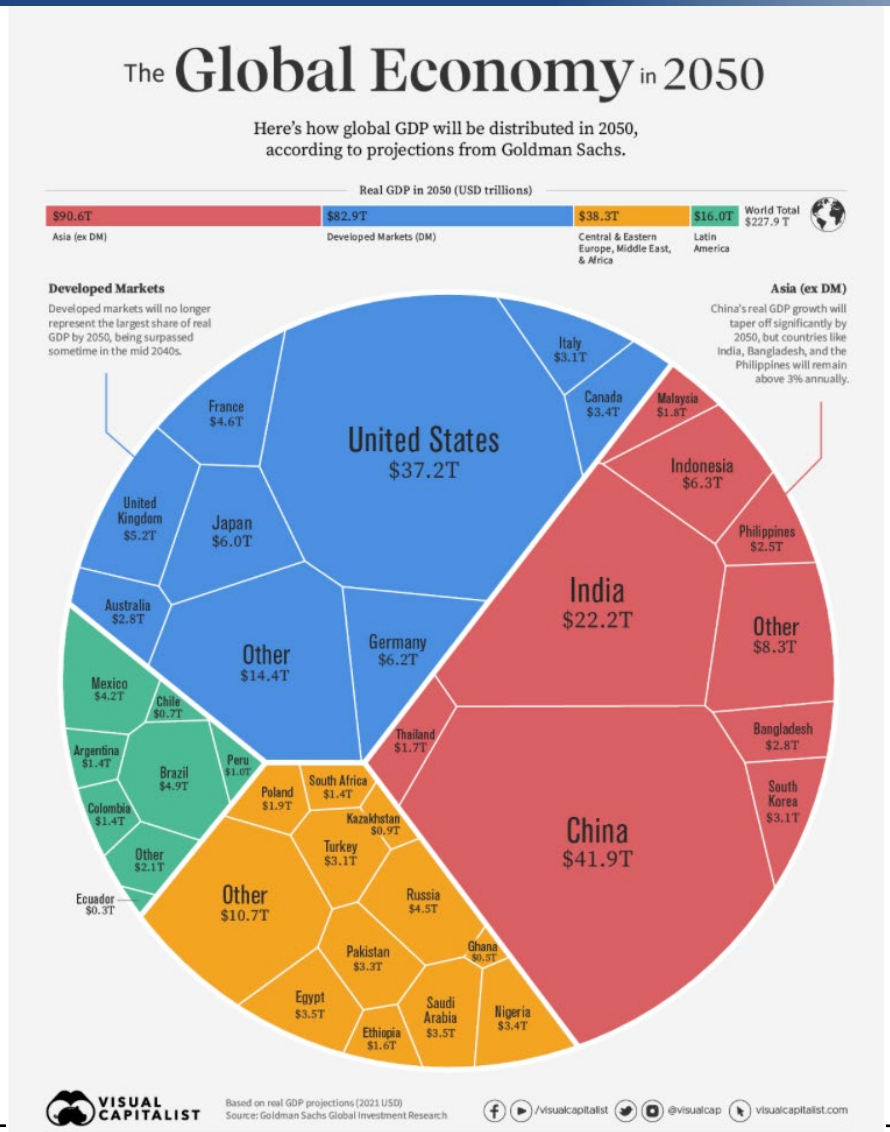
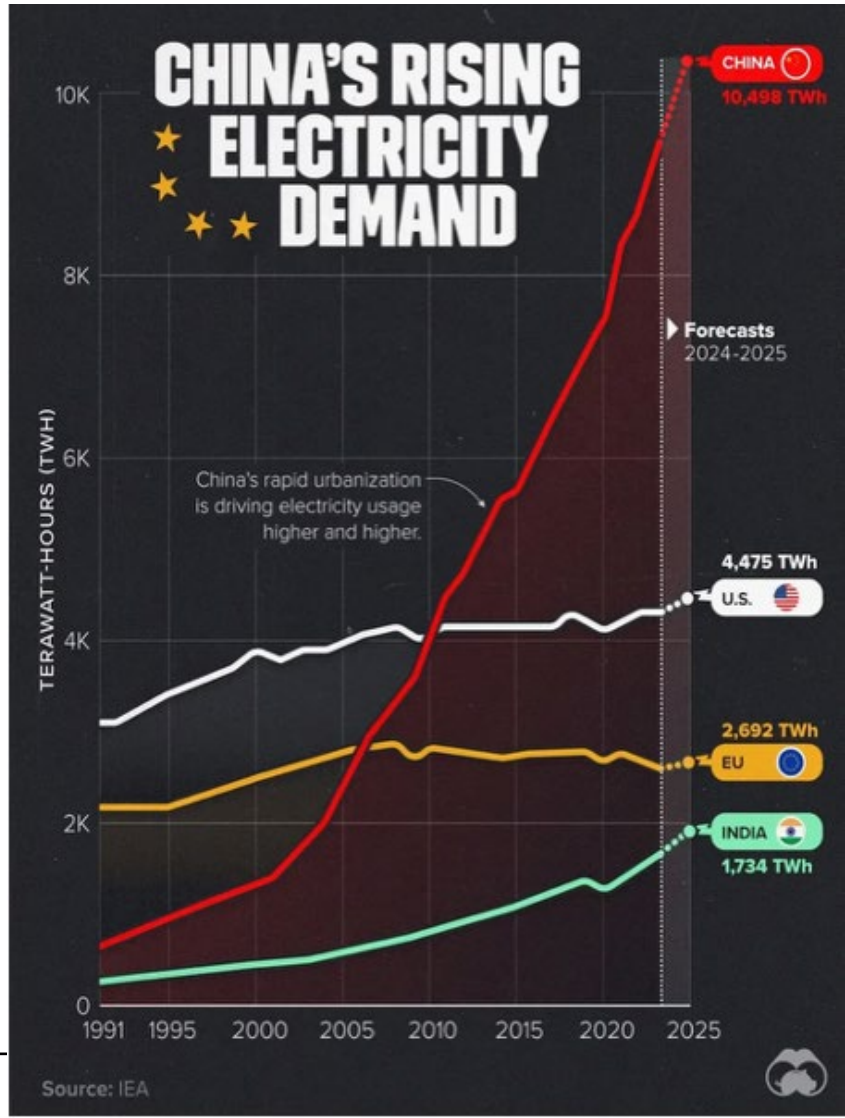
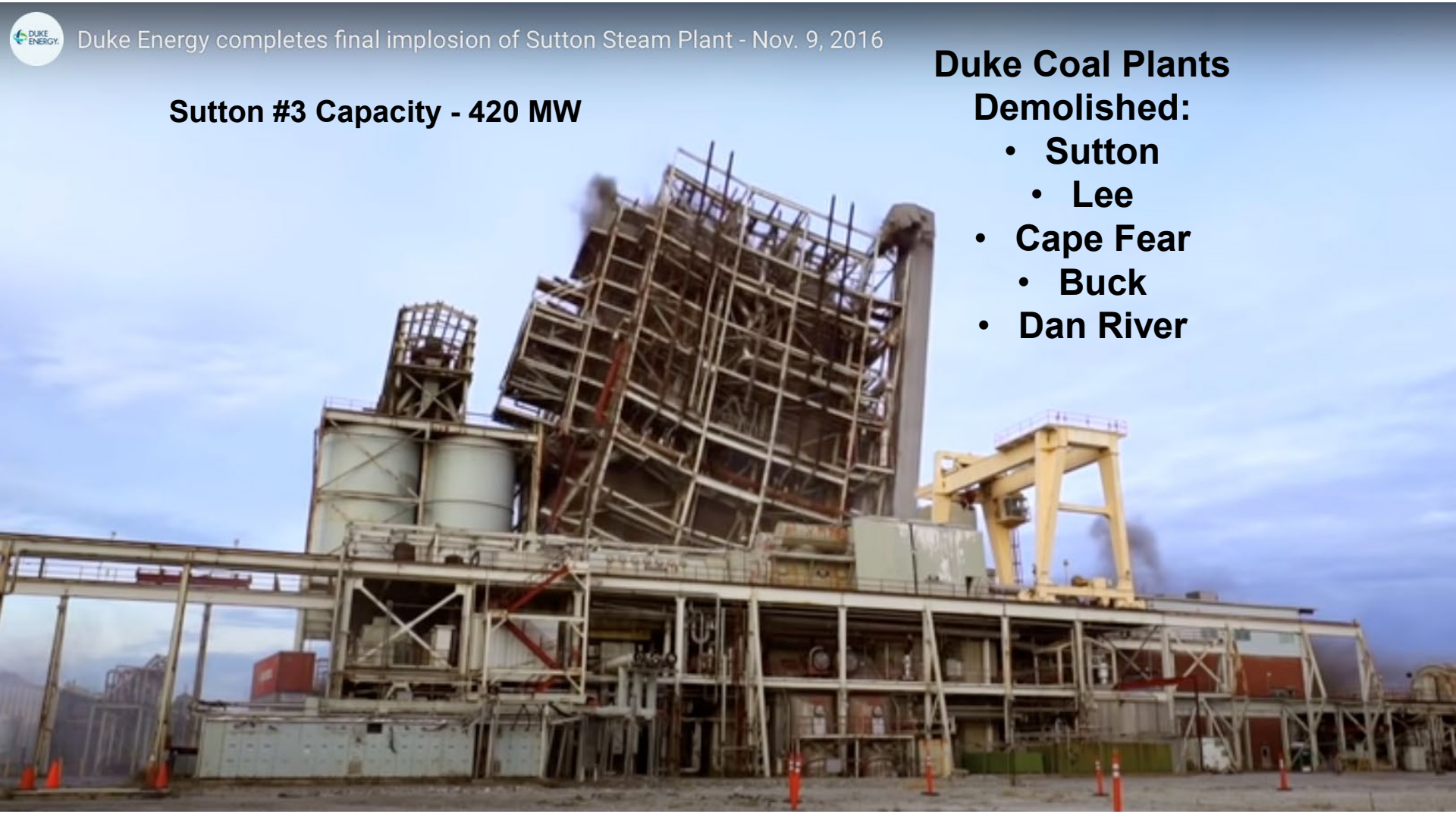
https:// Stormeng.com

China's Economy is Powered by Coal

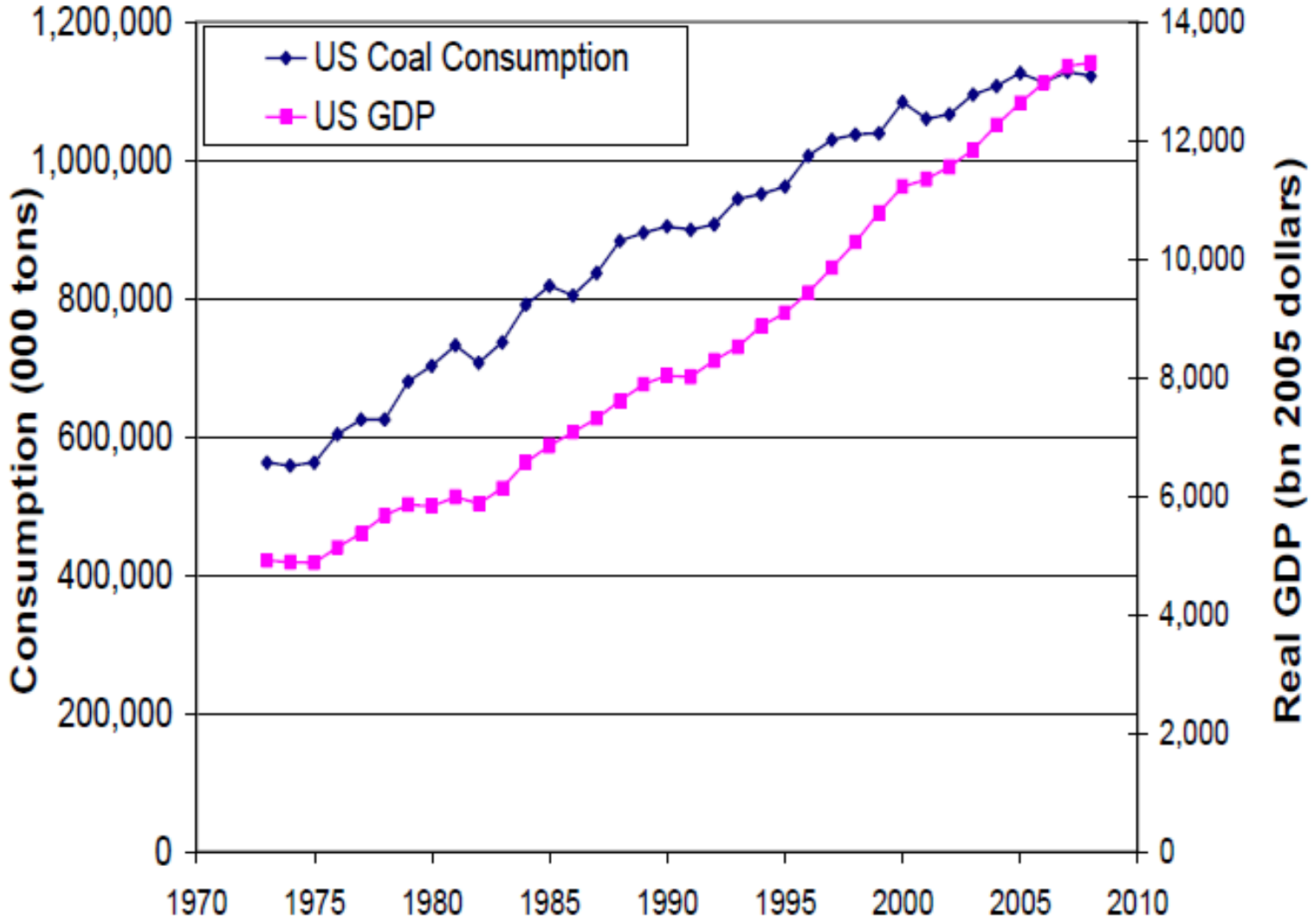


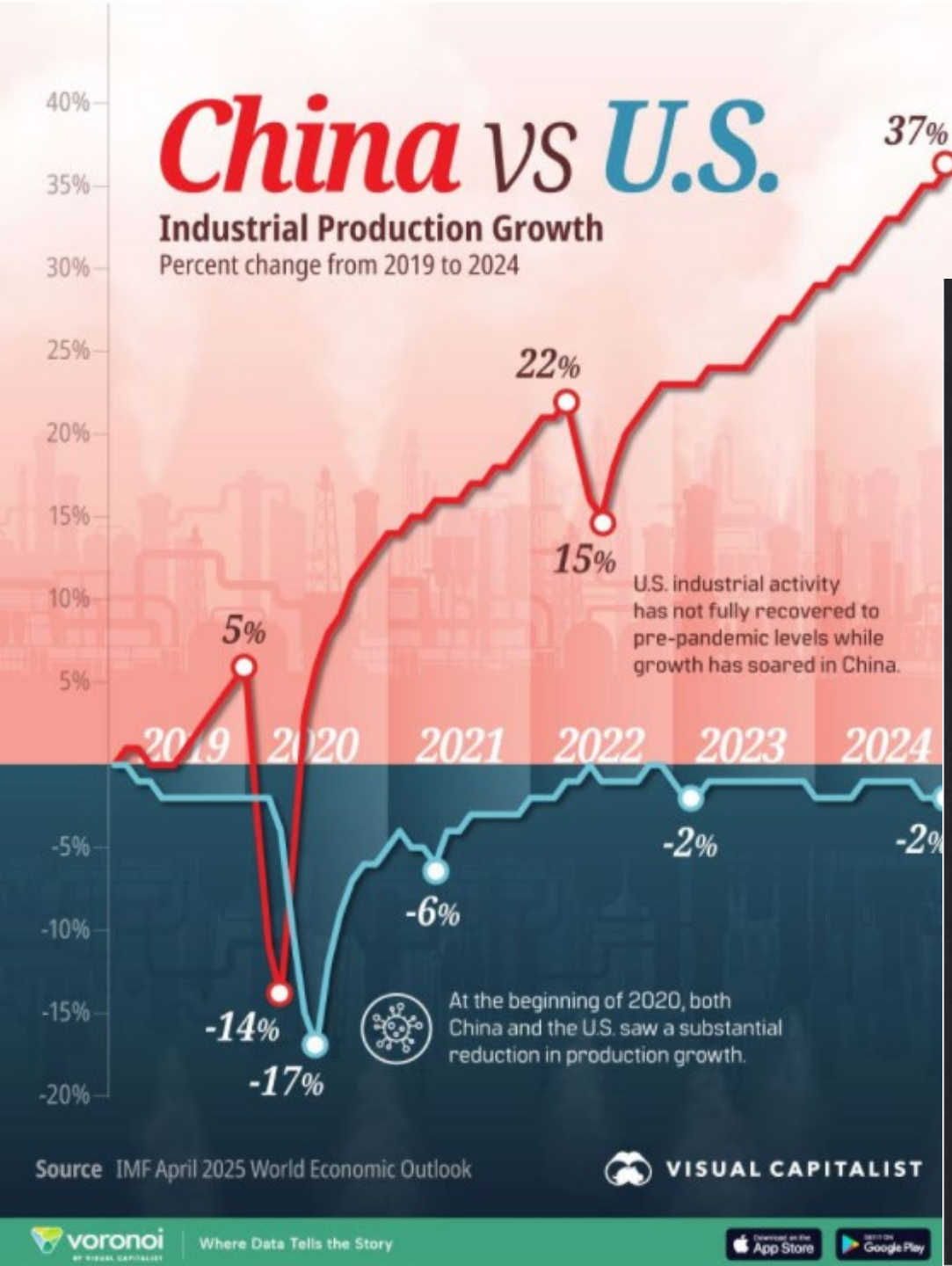


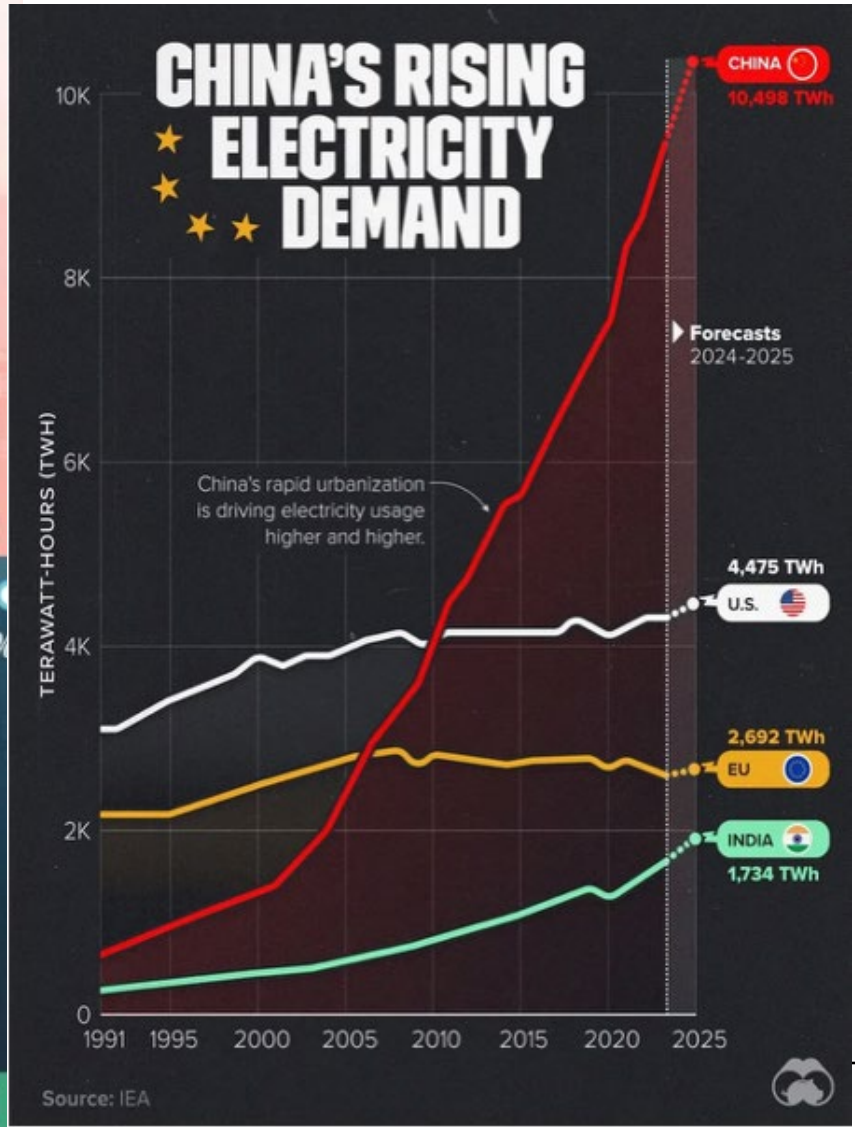
Examples of the Self-Inflicted Electricity Crisis



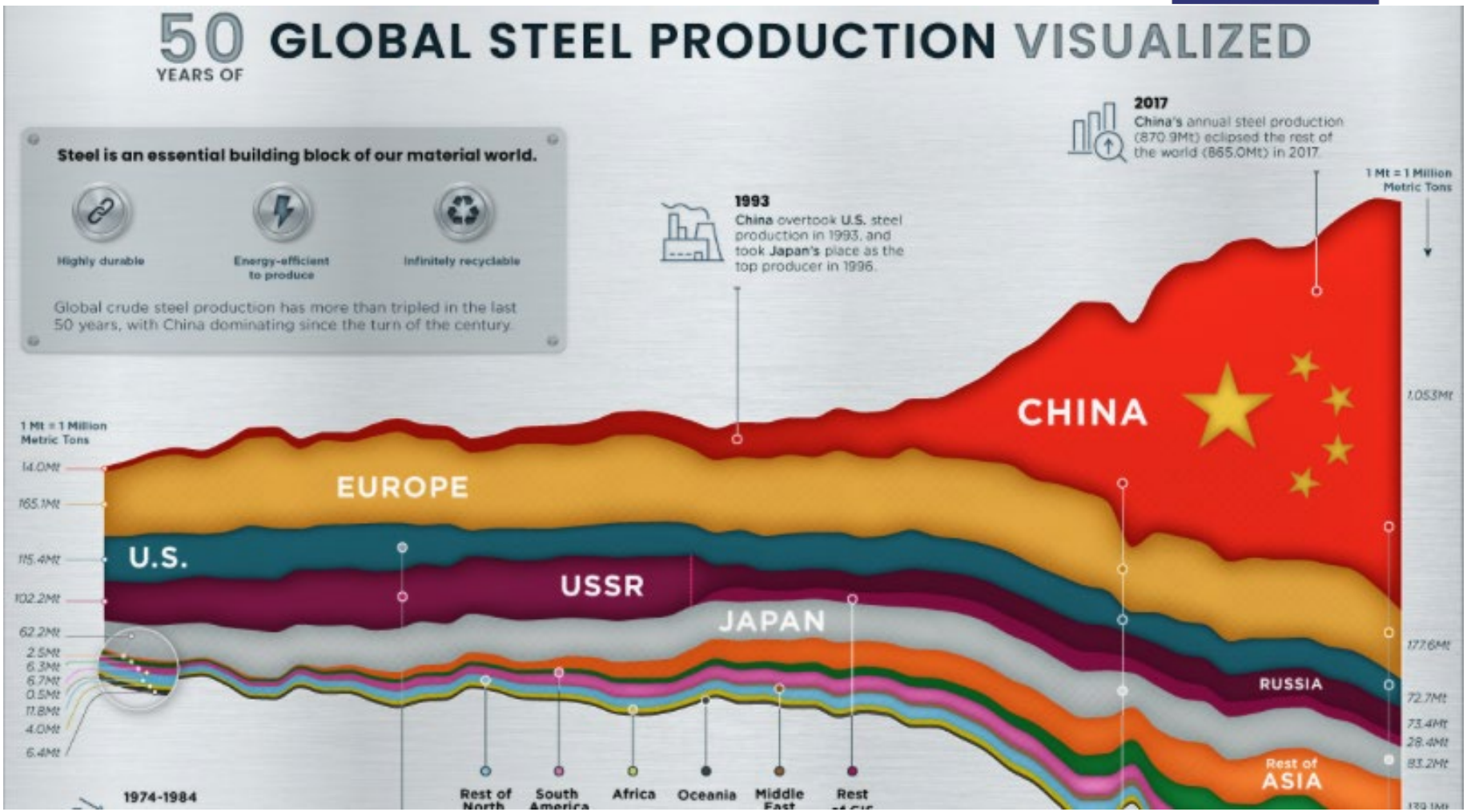
Economic Growth & Coal Production Tracked each other 1970-2010



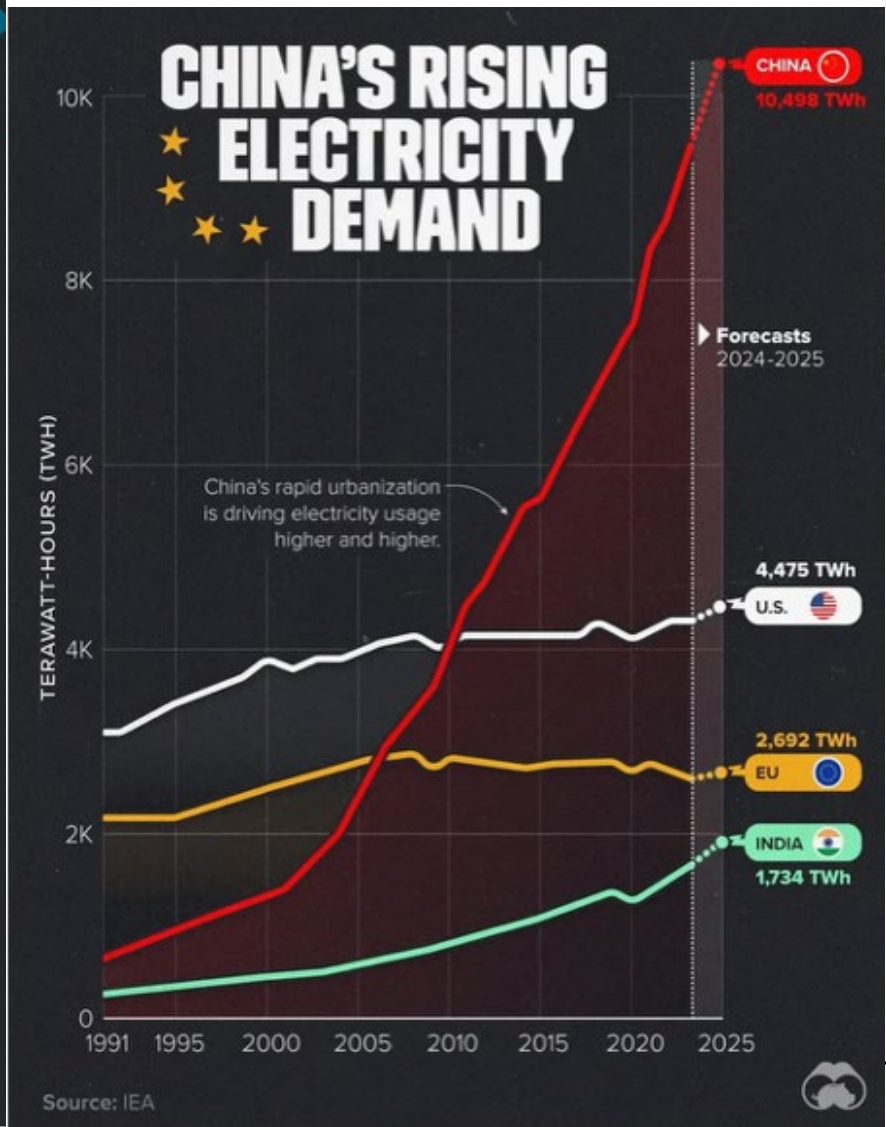

China vs U.S.
Industrial Production Growth
Percent change from 2019 to 2024
40%
35%
30%
25%
20%
15%
10%
5%
-5%
-10%
-15%
-20%
37%
22%
15%
5%
-14%
-17%
-6%
-2%
-2%
2019
2020
2021
2022
2023
2024
U.S. industrial activity has not fully recovered to pre-pandemic levels while growth has soared in China.
At the beginning of 2020, both China and the U.S. saw a substantial reduction in production growth.
Source IMF April 2025 World Economic Outlook
VISUAL CAPITALIST
voronoi
Where Data Tells the Story
Download on the App Store
GET IT ON Google Play


CHINA'S RISING ELECTRICITY DEMAND
TERAWATT-HOURS (TWH)
10K
8K
6K
4K
2K
0
1991
1995
2000
2005
2010
2015
2020
2025
CHINA
10,498 TWh
Forecasts
2024-2025
China's rapid urbanization is driving electricity usage higher and higher.
4,475 TWh
U.S.
2,692 TWh
EU
INDIA
1,734 TWh
Source: IEA

So Did China's Economic Growth Track Coal Use




China's Takeover of Global Manufacturing
China will account for nearly half of global manufacturing value added (MVA) in 2030, up from 6% in 2000.
2000
% of global MVA
U.S. 25%
China 6%
Japan 11%
Germany 8%
France 3%
Italy 4%
UK 3%
Other HIC 21%
UMIC 14%
LMIC 5%
Country Groupings
China
High income (HIC)
Upper middle income (UMIC)*
Low & Lower middle income (LMIC)
2030 Projection
China 45%
Low-cost labor & government initiatives have made China a manufacturing powerhouse
U.S. 11%
Japan 5%
Germany 3%
S. Korea 3%
Other HIC 16%
UMIC 8%
LMIC 9%
VISUAL CAPITALIST
*Excludes China. Source: UN Industrial Development Organization (2024)


CHINA'S RISING ELECTRICITY DEMAND
TERAWATT-HOURS (TWH)
10K
8K
6K
4K
2K
0
1991
1995
2000
2005
2010
2015
2020
2025
Forecasts 2024-2025
China's rapid urbanization is driving electricity usage higher and higher.
CHINA
10,498 TWh
4,475 TWh
U.S.
2,692 TWh
EU
INDIA
1,734 TWh
Source: IEA

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