# Implications of North America Energy and Climate Policies
## *A U.S. Industrial Base Perspective*

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# Relative, Strategic, Competitive Advantage

*The capacity and ability of one actor to achieve their objectives compared to a competitor or competitors*

*Economic, Military, Technological, Geopolitical*

Photo NDU

# The PRC as a Pacing Challenge

*While Russia constitutes an immediate and acute threat…"the PRC, by contrast, is the only competitor with both the intent to reshape the international order and, increasingly, the economic, diplomatic, military, and technological power to advance that objective"**

*"The PRC presents the most consequential and systemic challenge, while Russia poses acute threats—both to vital U.S. national interests abroad and to the homeland. PRC efforts and activities to contest the rules-based international order make it the pacing challenge…"***

*Biden, J. (2022). National Security Strategy. *The White House*, 23.

**National Defense Strategy of the United States of America. (2022). *U.S. DoD*.

"Both nations [RF, CN] seek military and technological superiority over the U.S. and *will continue attempts to overcome competitive disadvantages by fusing their national capabilities to destabilize the international order.* We will be fully engaged in great power competition with China and Russia, made increasingly complex by the continuing rogue actions of North Korea, Iran's malign influence, and threats from violent extremist organizations."

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PRESERVING OUR COMPETITIVE ADVANTAGE

PERSONNEL AND READINESS STRATEGY FOR 2030

US DEPARTMENT OF DEFENSE

OCTOBER 2020


# America's Industrial Base

## Depth, Diversity and Innovative Capacity Will Underpin Relative, Competitive, Strategic Advantage

# Overview

- A contrast in energy trends
- A contrast in energy policy and strategy
- Industrial base implications
- National security concerns

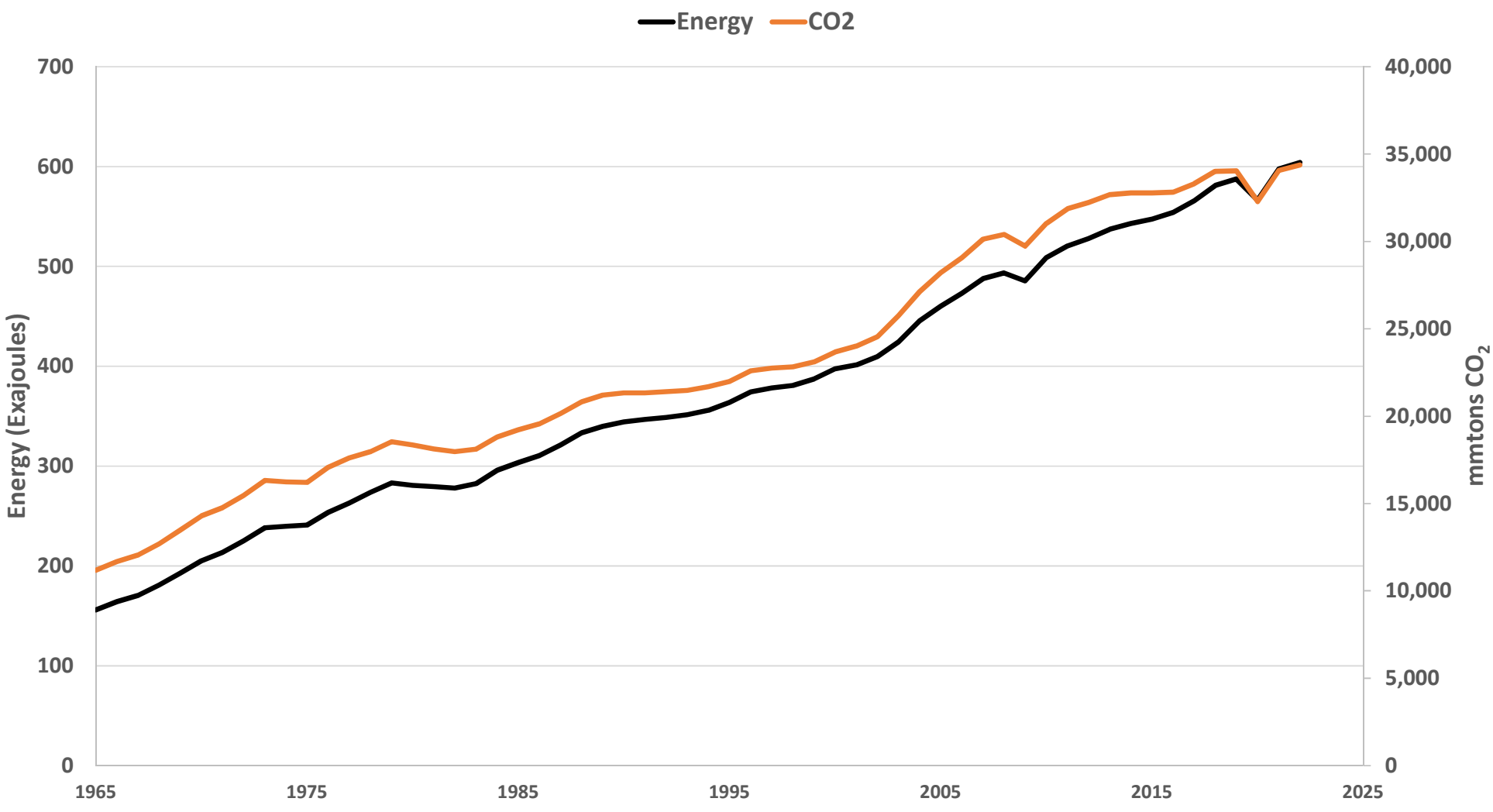
# Contrast in Energy Trends

## FOSSIL FUELS, NUCLEAR, RENEWABLES AND $CO_2$

***Data Source:*** BP Statistical Review 2023

**Compiled By:** David Gattie

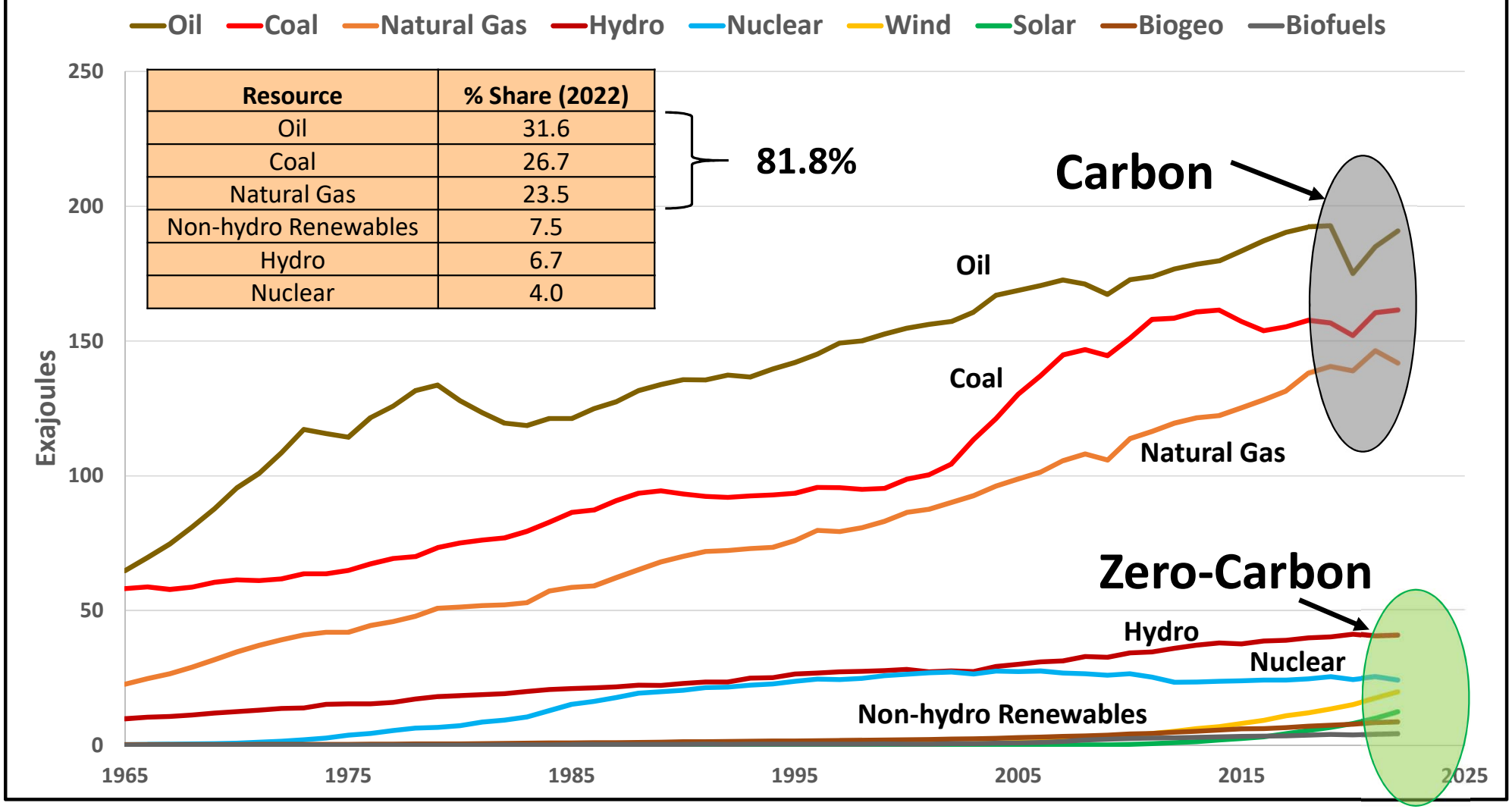
# Global Energy Consumption & $CO_2$ Emissions



***Data Source:***
BP Statistical Review 2023

# World Energy Consumption: Transportation, Electricity, Heat

**Compiled By:** David Gattie



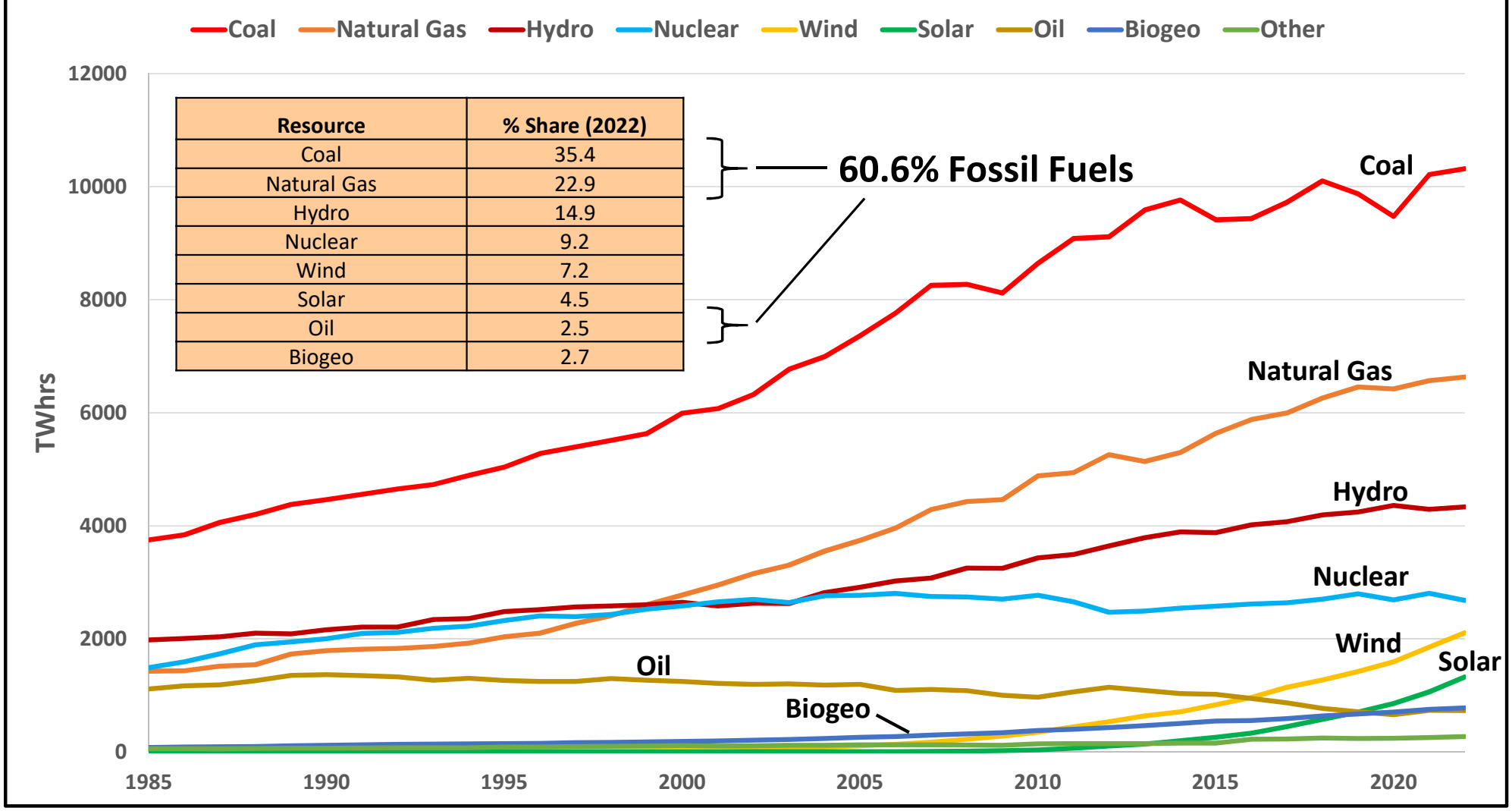

| Resource | % Share (2022) |
|---|---|
| Oil | 31.6 |
| Coal | 26.7 |
| Natural Gas | 23.5 |
| Non-hydro Renewables | 7.5 |
| Hydro | 6.7 |
| Nuclear | 4.0 |

**81.8%**

***Data Source:*** BP Statistical Review 2023

**Compiled By:** David Gattie

# World Electricity by Fuel

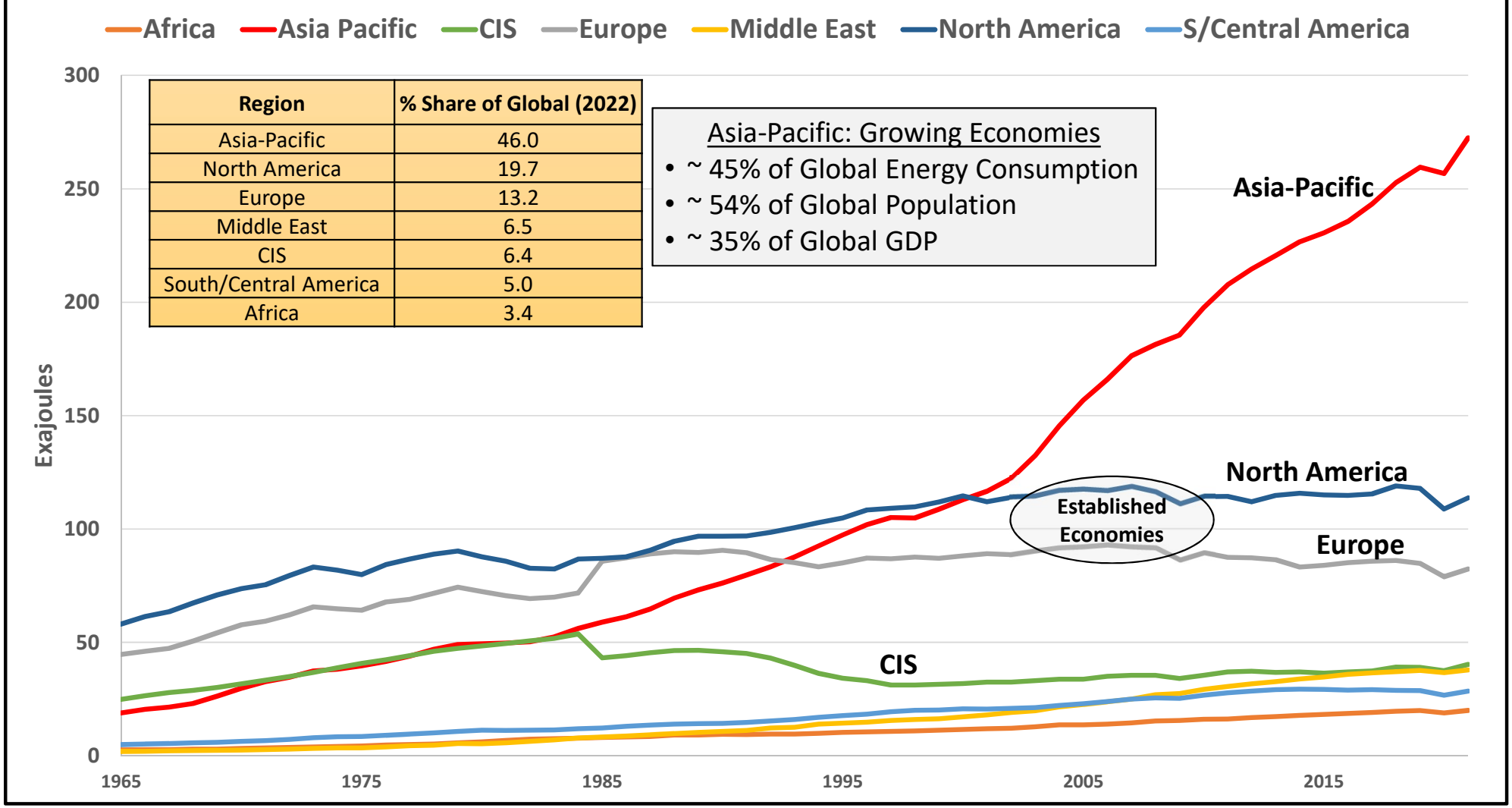



| Resource | % Share (2022) |
|---|---|
| Coal | 35.4 |
| Natural Gas | 22.9 |
| Hydro | 14.9 |
| Nuclear | 9.2 |
| Wind | 7.2 |
| Solar | 4.5 |
| Oil | 2.5 |
| Biogeo | 2.7 |

***Data Source:*** BP Statistical Review 2022

**Compiled By:** David Gattie

# Energy Consumption by Region




| Region | % Share of Global (2022) |
|---|---|
| Asia-Pacific | 46.0 |
| North America | 19.7 |
| Europe | 13.2 |
| Middle East | 6.5 |
| CIS | 6.4 |
| South/Central America | 5.0 |
| Africa | 3.4 |

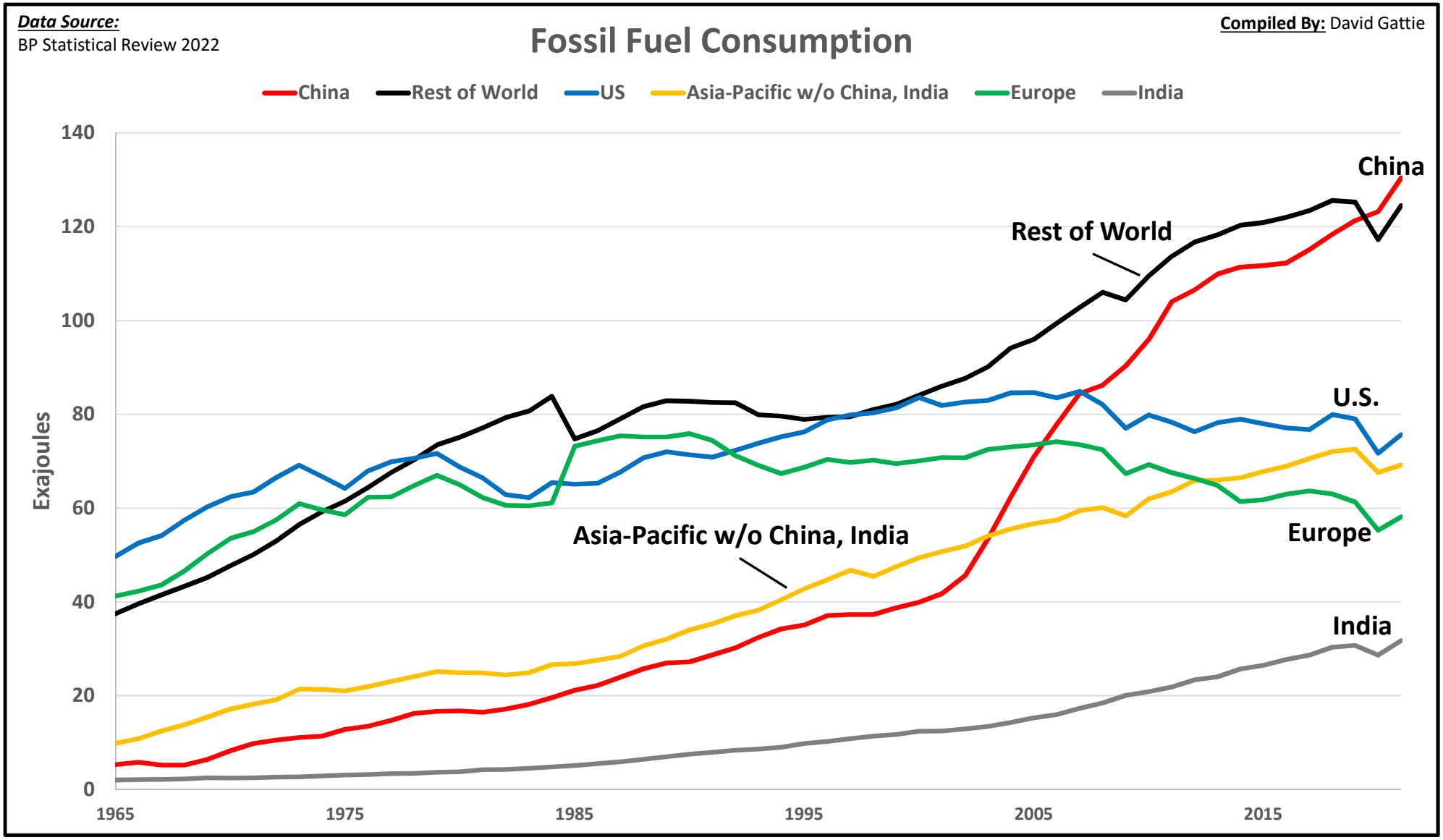
Asia-Pacific: Growing Economies

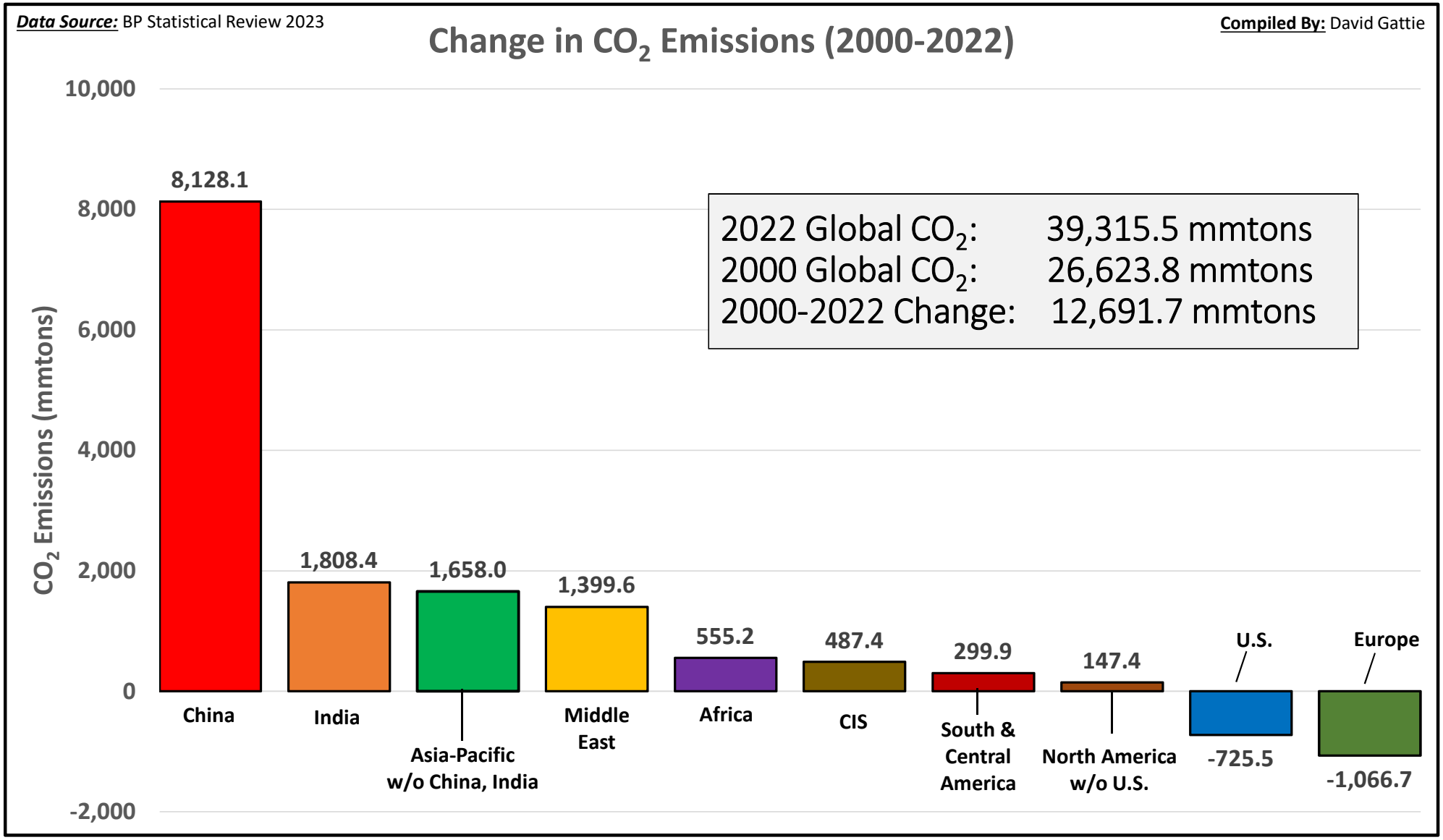
- ~ 45% of Global Energy Consumption
- ~ 54% of Global Population
- ~ 35% of Global GDP

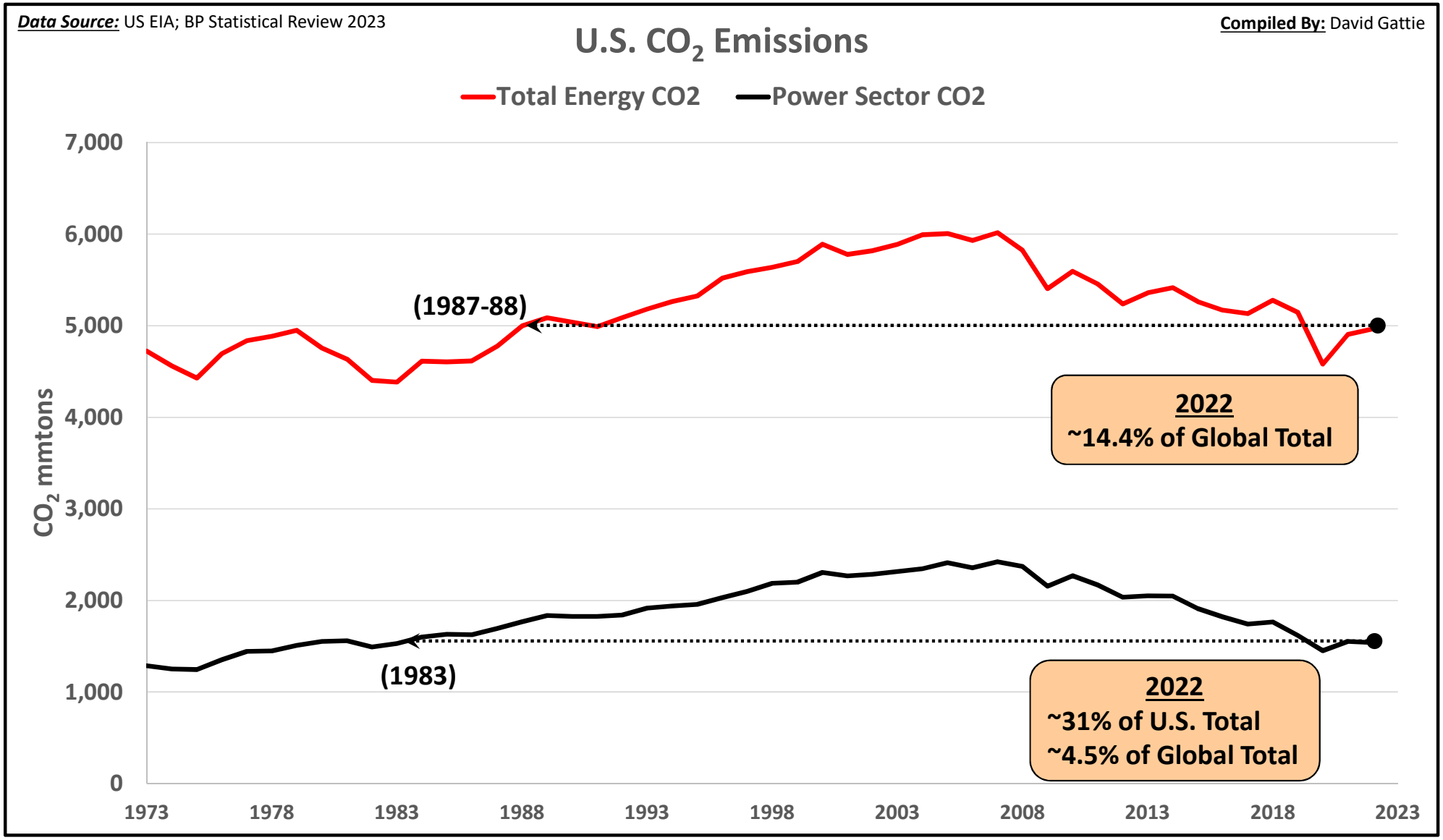
***Data Source:***
BP Statistical Review 2022

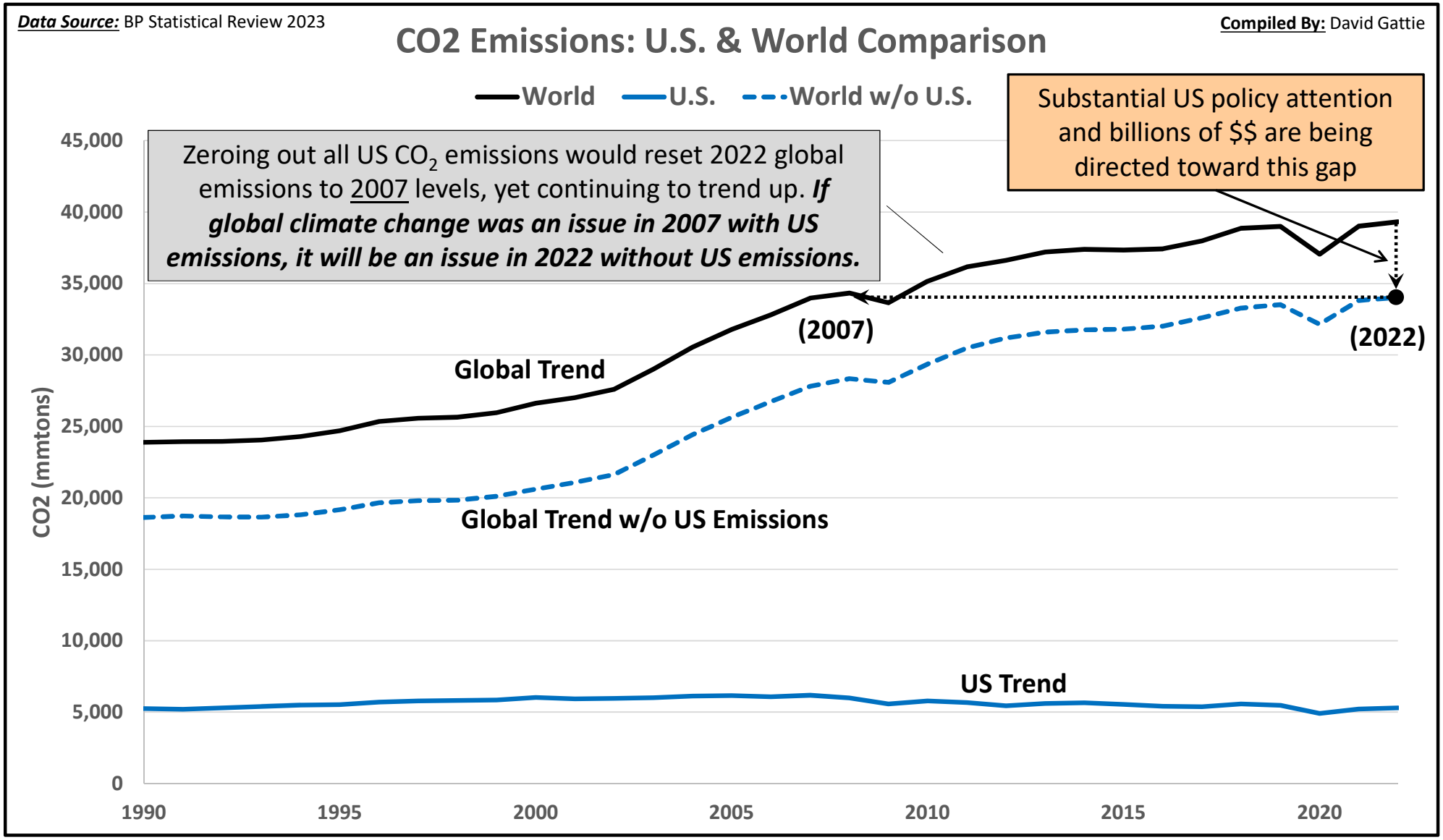
# Fossil Fuel Consumption

**Compiled By:** David Gattie




Data Source: BP Statistical Review 2023
Compiled By: David Gattie
Change in $CO_2$ Emissions (2000-2022)
$CO_2$ Emissions (mmtons)
10,000
8,000
6,000
4,000
2,000
0
-2,000
2022 Global $CO_2$: 39,315.5 mmtons
2000 Global $CO_2$: 26,623.8 mmtons
2000-2022 Change: 12,691.7 mmtons
8,128.1
1,808.4
1,658.0
1,399.6
555.2
487.4
299.9
147.4
-725.5
-1,066.7
China
India
Asia-Pacific w/o China, India
Middle East
Africa
CIS
South & Central America
North America w/o U.S.
U.S.
Europe

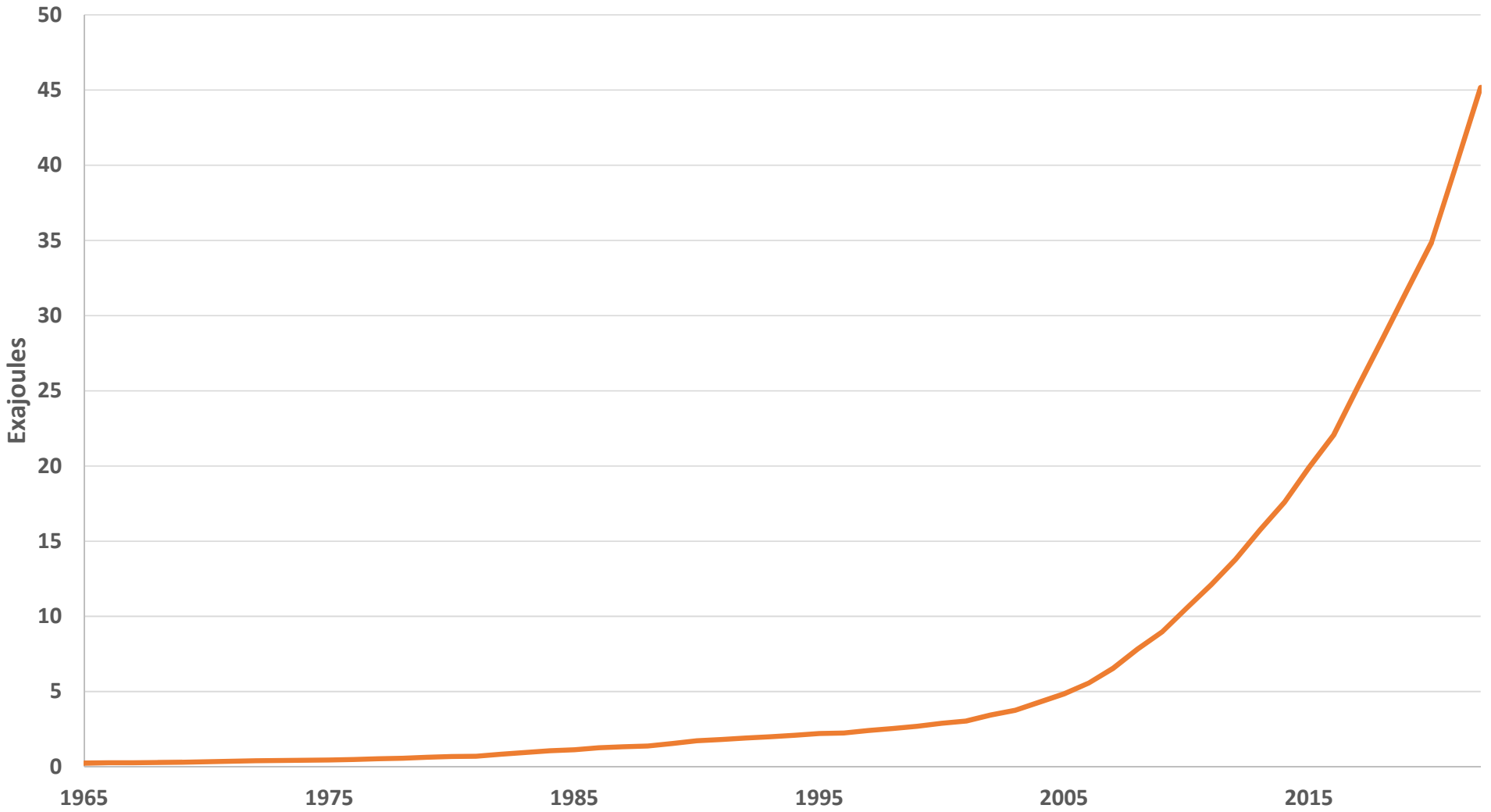

Data Source: US EIA; BP Statistical Review 2023
Compiled By: David Gattie
U.S. CO2 Emissions
Total Energy CO2
Power Sector CO2
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
CO2 mmtons
(1987-88)
(1983)
2022
~14.4% of Global Total
2022
~31% of U.S. Total
~4.5% of Global Total
1973
1978
1983
1988
1993
1998
2003
2008
2013
2018
2023


Data Source: BP Statistical Review 2023
Compiled By: David Gattie
CO2 Emissions: U.S. & World Comparison
World
U.S.
World w/o U.S.
Substantial US policy attention and billions of $$ are being directed toward this gap
Zeroing out all US CO2 emissions would reset 2022 global emissions to 2007 levels, yet continuing to trend up. If global climate change was an issue in 2007 with US emissions, it will be an issue in 2022 without US emissions.
(2007)
(2022)
Global Trend
Global Trend w/o US Emissions
US Trend
CO2 (mmtons)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
1990
1995
2000
2005
2010
2015
2020

***Data Source:***
BP Statistical Review 2023

# World Energy Consumption of Non-hydro Renewables

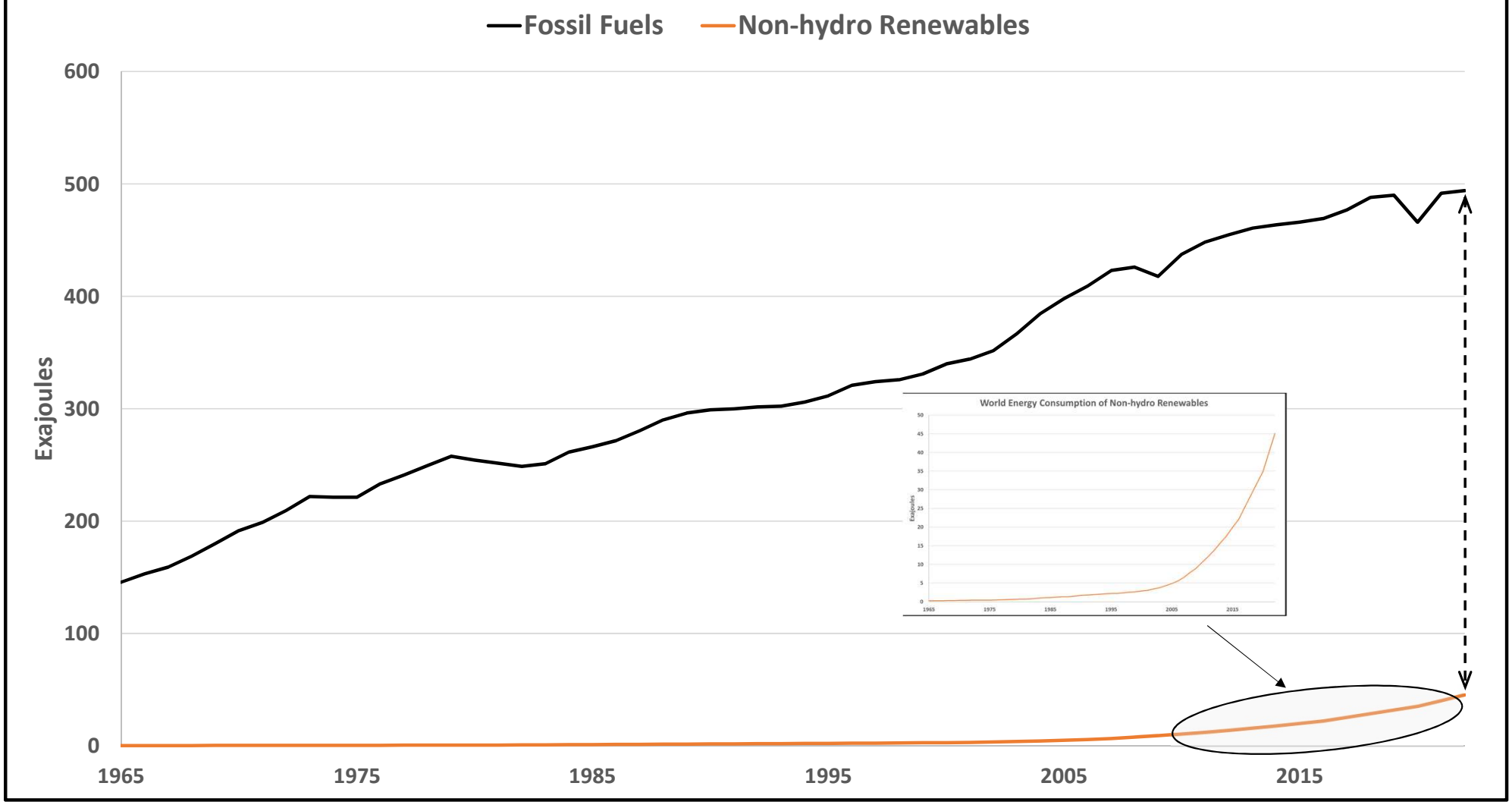
**Compiled By:** David Gattie



***Data Source:***
BP Statistical Review 2023

# World Energy: Fossil Fuels & Non-hydro Renewables

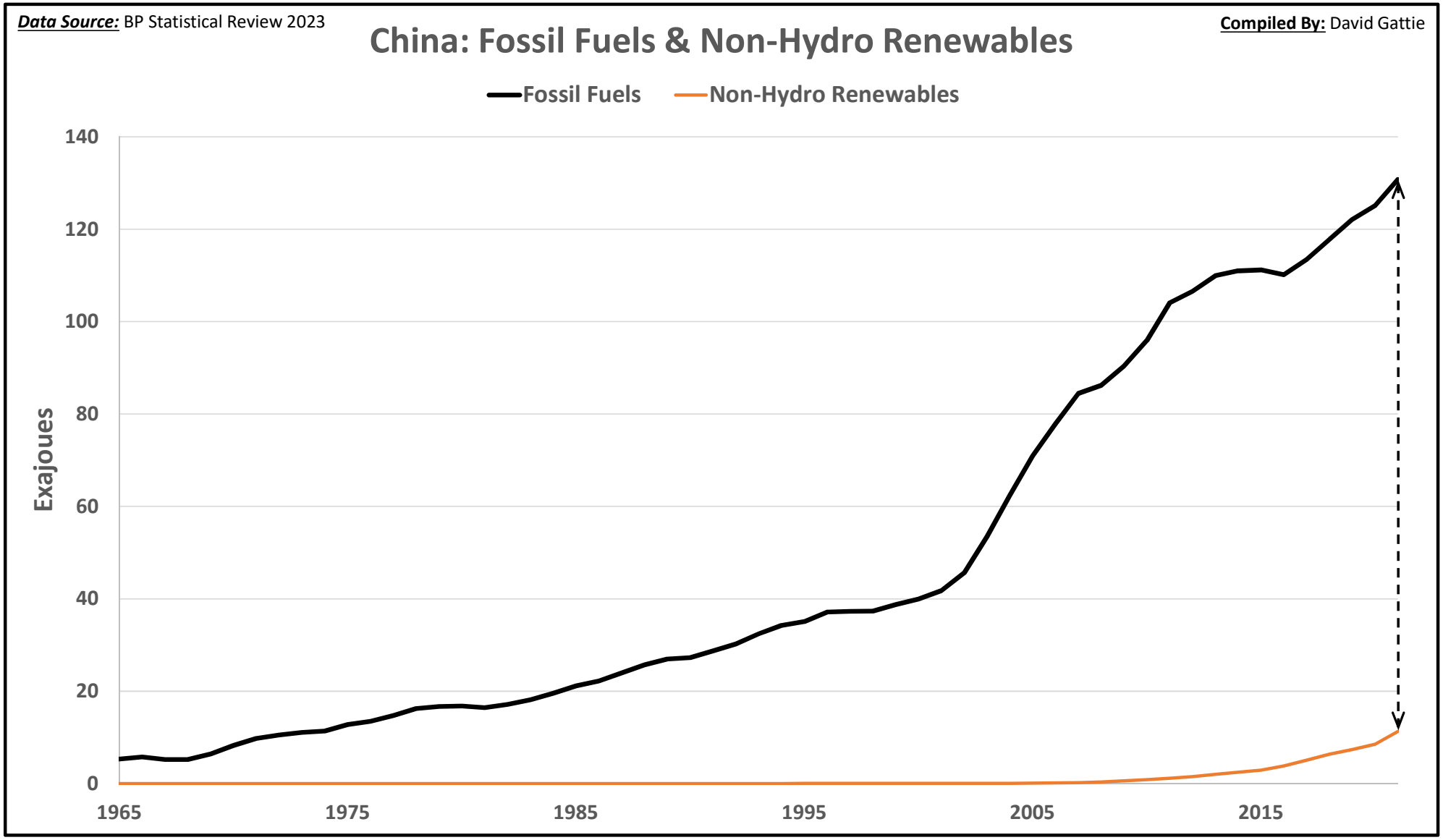
**Compiled By:** David Gattie



***Data Source:*** BP Statistical Review 2023

**Compiled By:** David Gattie

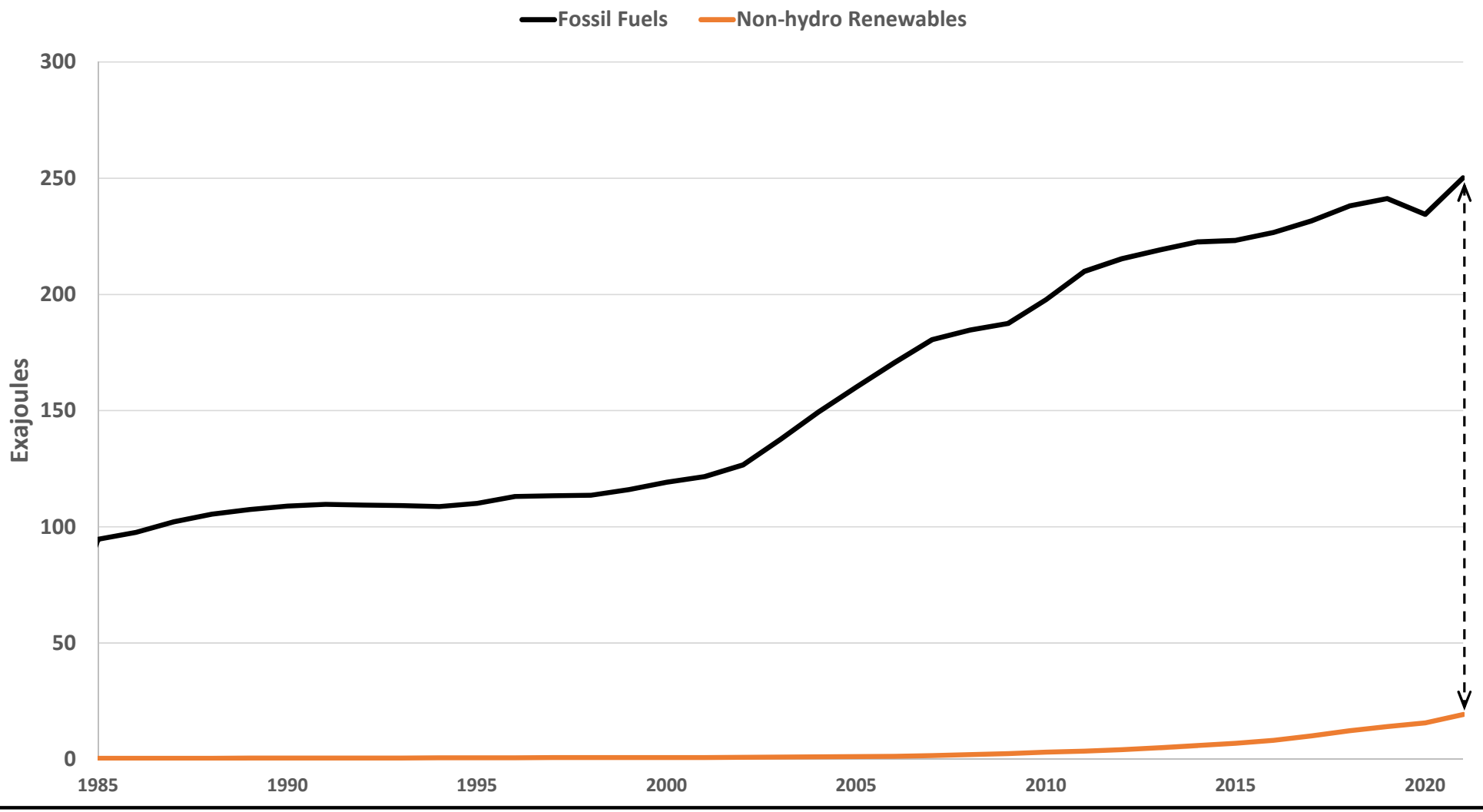
# China: Fossil Fuels & Non-Hydro Renewables



***Data Source:***
BP Statistical Review 2022

# Emerging Markets: Fossil Fuels & Non-hydro Renewables

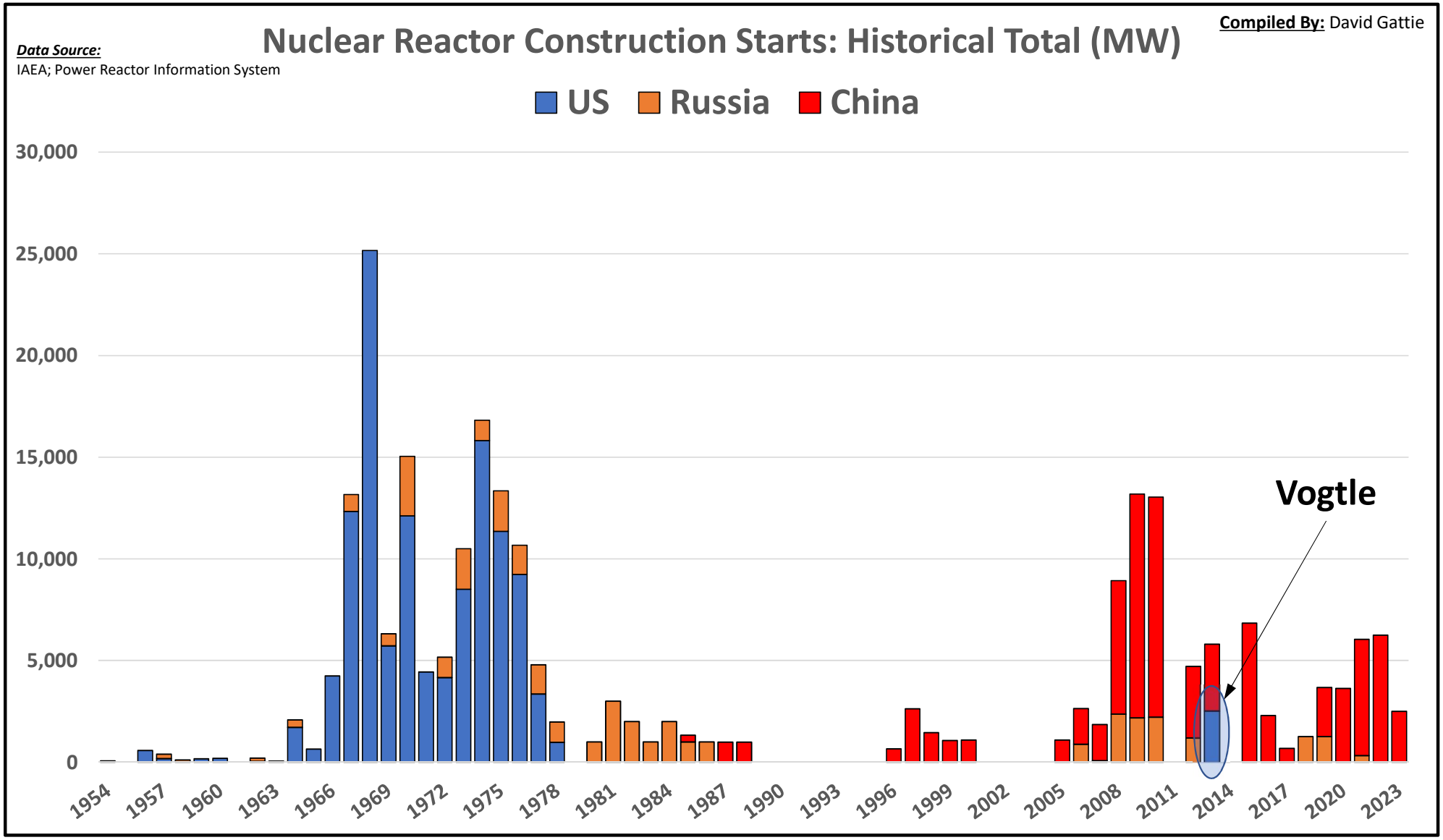
**Compiled By:** David Gattie



**Compiled By:** David Gattie

# Nuclear Reactor Construction Starts: Historical Total (MW)

***Data Source:***
IAEA; Power Reactor Information System

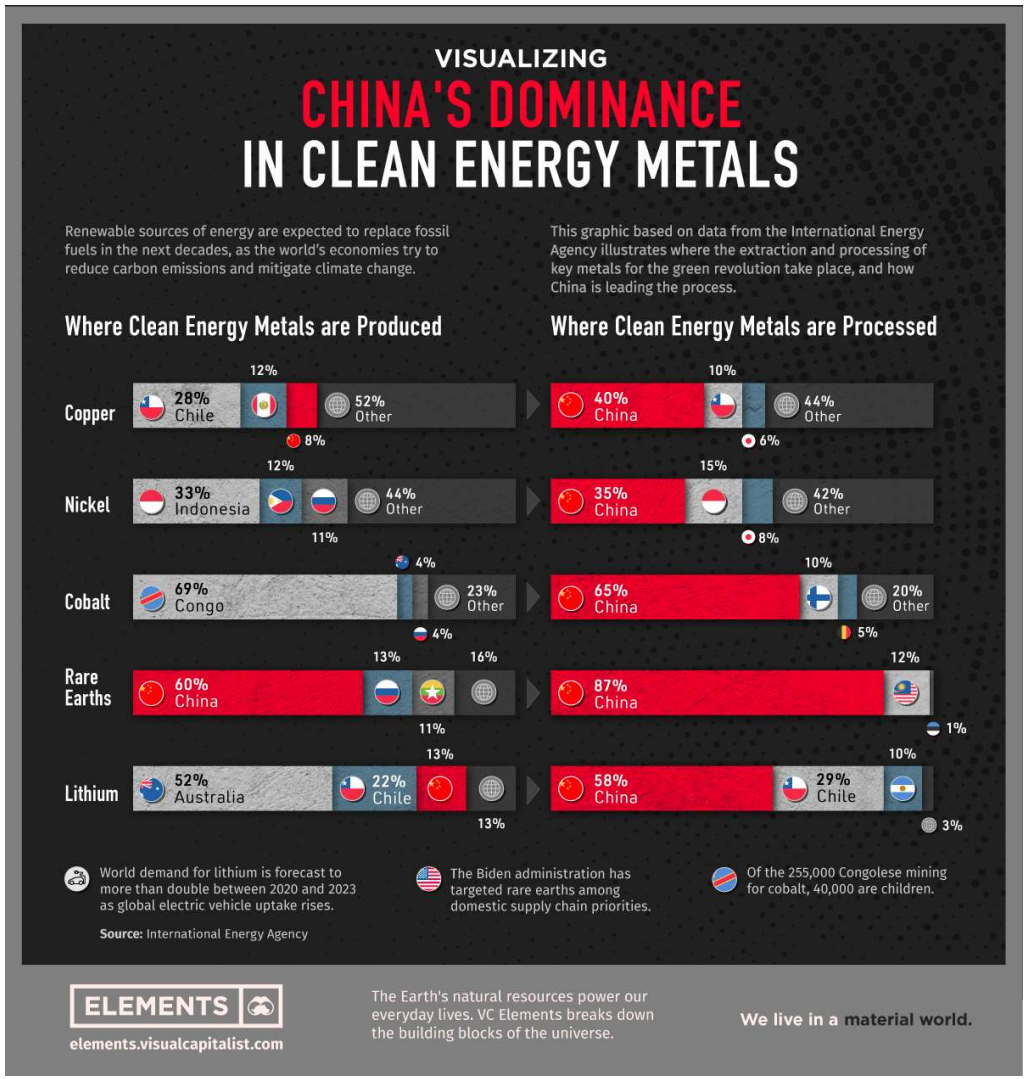


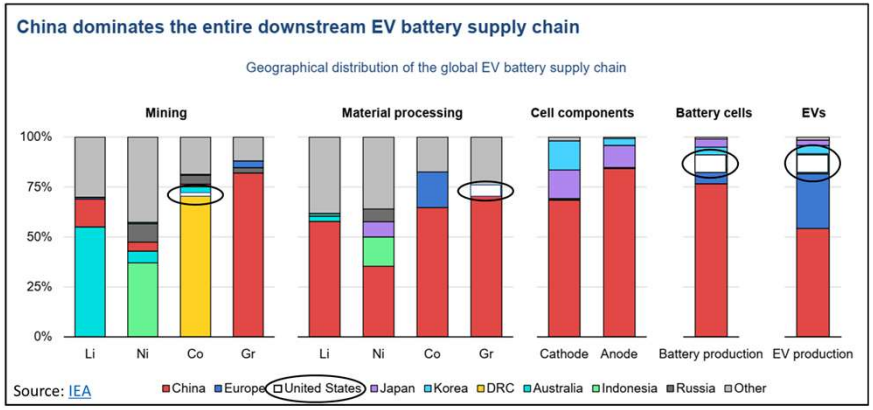
# Nuclear Power in the 21st Century

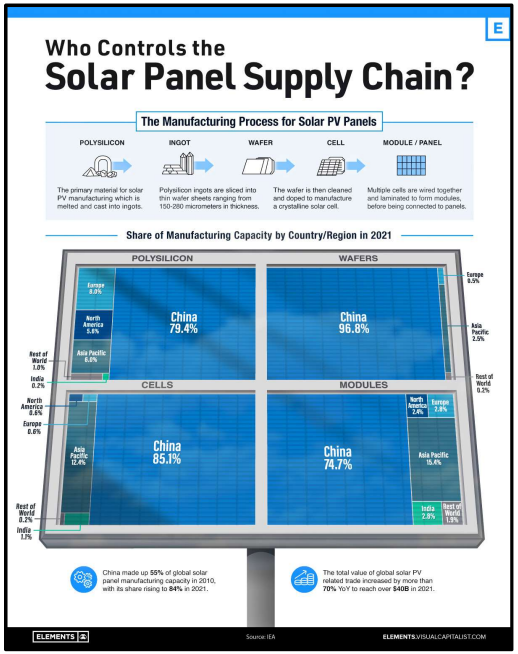
Of these 170 reactors, 114 are associated with China or Russia—either by location or by reactor technology.

| Number of Reactors Since 2000 | | | |
|---|---|---|---|
| **Country** | **Connected to Grid** | **Under Construction** | **Russian or Chinese** |
| **China** | 52 | 21 | 73 |
| **Russia** | 13 | 3 | 16 |
| **India** | 12 | 8 | 4 |
| **South Korea** | 11 | 3 | 0 |
| **Japan** | 5 | 2 | 0 |
| **Pakistan** | 6 | 0 | 6 |
| **Czech Republic** | 2 | 0 | 2 |
| **Ukraine** | 2 | 2 | 2 |
| **Argentina** | 1 | 1 | 0 |
| **Belarus** | 2 | 0 | 2 |
| **Brazil** | 1 | 1 | 0 |
| **Iran** | 1 | 1 | 1 |
| **UAE** | 3 | 1 | 0 |
| **US** | 2 | 1 | 0 |
| **Romania** | 1 | 0 | 0 |
| **Bangladesh** | 0 | 2 | 2 |
| **Finland** | 1 | 0 | 0 |
| **France** | 0 | 1 | 0 |
| **Slovakia** | 1 | 1 | 2 |
| **Taiwan** | 0 | 0 | 0 |
| **Turkey** | 0 | 4 | 4 |
| **UK** | 0 | 2 | 0 |
| ***Total*** | ***116*** | ***54*** | ***114*** |

***Source:*** *World Nuclear Association; IAEA (2023)*




**Shift to Dependency on China and Its Partners**

# Contrast in Energy Policy and Strategy

*AMERICA AND ITS COMPETITORS*

# Xi Doubles Down on Alliance With Putin

October 28, 2022

China's top diplomat signaled that Chinese leader Xi Jinping, fresh from extending his power for a norm-breaking third term, intends to double-down on his tight relationship with Russia's Vladimir Putin—*driving an even deeper wedge between the two authoritarian rulers and the West*. Russia and China are also conducting more financial transactions in the ruble and yuan, rather than the euro or dollar, a move that helps insulate the two against future sanctions and put the Chinese currency into wider circulation. In a written statement, China's Foreign Ministry said "China and Russia are *comprehensive strategic cooperative partners* of each other. The development of bilateral relations is based on the principles of non-alliance, non-confrontation and non-targeting of third parties."

Russia and China have long sought to dull the U.S.'s influence in the world, a shared objective that has come into sharper focus in recent years as *the two nations have grown confident they can reshape an international order that both view as biased in favor of the West and its allies*.


Photo Credit: The Wall Street Journal

Sources: Xi-Putin CN RF Relations; CN Nods to Tighter Ties With RF

# Xi Pledges More Energy Deals With Gulf Producers

"Saudi Arabia has always considered China as a strategic partner, and that the Committee strives for further alignment between the Saudi and China visions of the future, especially in the energy sphere, where there are multiple synergies," Prince Abdulaziz said. In the meeting, the co-chairs discussed areas where Saudi Arabia and China look to strengthen their relationship, such as oil and petrochemicals, decarbonization technologies, electricity and renewables, hydrogen, energy efficiency, civil nuclear energy, and supply chain security, in addition to industrial cooperation, the fourth industrial revolution, mining and logistics, civil aviation and aviation security, and digital economy." (October 27, 2022)

# Xi Visits KSA

December 8, 2022

Chinese leader Xi Jinping traveled to Saudi Arabia this week for a series of summits with countries from around the Middle East, cementing over thirty energy and investment deals and basking in a good bit of pageantry courtesy of the host nation. From the Saudi side, China is the Kingdom's number one trade partner, a major tech supplier, a long-term energy customer, and *a comprehensive strategic partner* with a permanent seat on the United Nations Security Council

The Saudi energy minister on Wednesday said Riyadh would stay *a "trusted and reliable" energy partner for Beijing* and the two would boost cooperation in energy supply chains by setting up *a regional centre* in the kingdom for Chinese factories.

One of the main reasons behind Xi's visit to Saudi Arabia is to further advance the Belt and Road Initiative, China's ambitious plan to connect Asia, Europe, and Africa through infrastructure projects and trade. *Saudi Arabia is a key partner in the BRI, as it sits at the crossroads of Asia and Europe and is a major transit hub for goods and energy*.

Endowed with rich energy resources, including 30 percent of the oil reserve and 20 percent of the natural gas reserve of the world, *GCC countries are an energy tank for world economy.*

Photo Credit: The Wall Street Journal

Sources:
Xi Letter to KSA; Key Takeaways from Xi's Visit to KSA
What Xi's Visit to KSA Means

# The U.S. Energy Policy Trend

- The climate crisis has been placed at the center of U.S. foreign policy and national security
  - Executive Order 14008
- Inflation Reduction Act was passed—favors renewable energy technologies
  - August 16, 2022 ($433 billion)
- EPA proposed carbon emission standards for coal and natural gas power plants
  - May 11, 2023—This is the 2015 Clean Power Plan 2.0

# Downward Pressure on Fossil Fuel Plants

November 5, 2022

"No one is building new coal plants because they can't rely on it, even if they have all the coal guaranteed for the rest of their existence of the plant. *We're going to be shutting these plants down all across America and having wind and solar."* (President Biden)


Photo Credit: E&E News

May 11, 2023

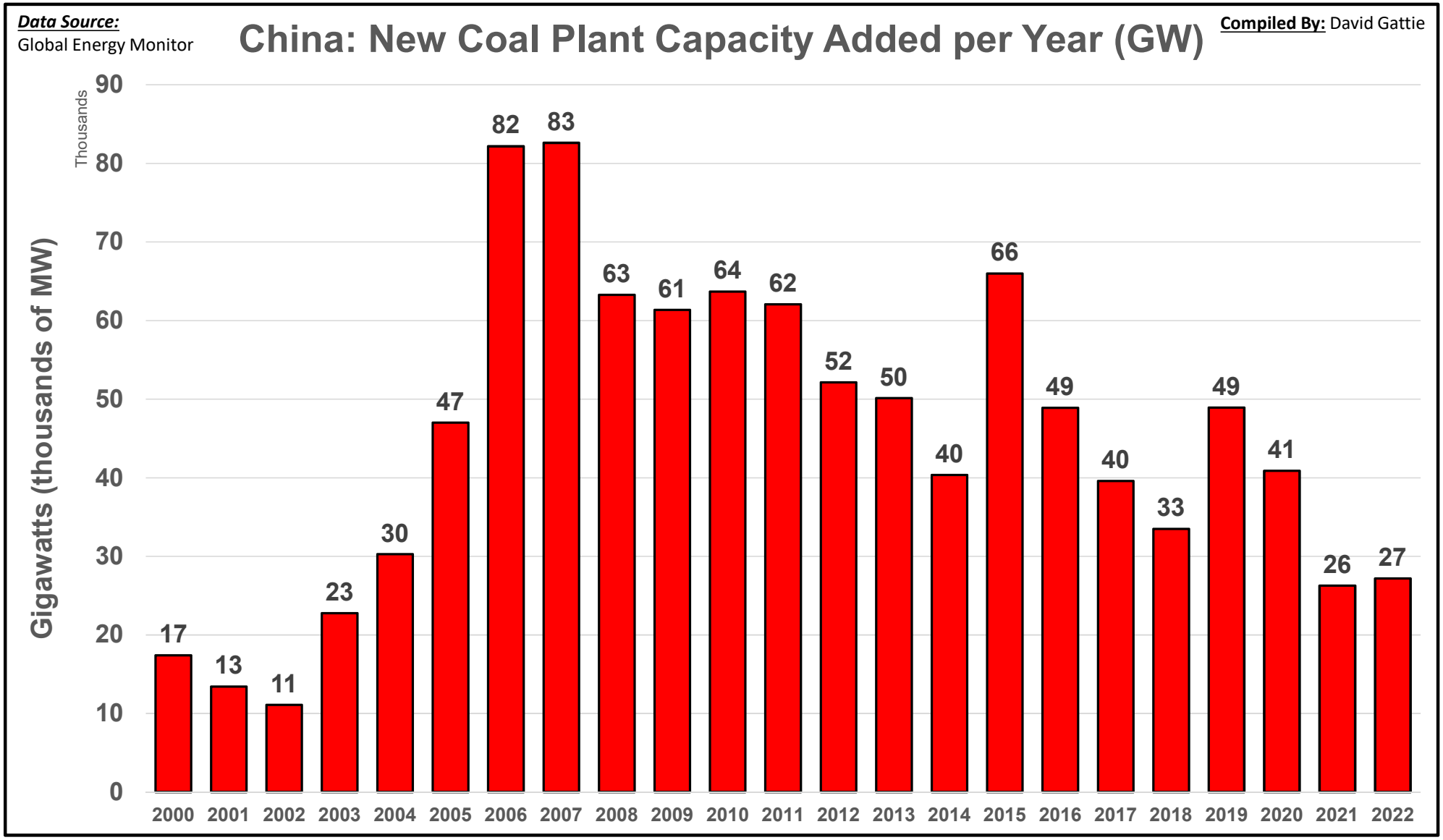
EPA's proposed power plant rule seeks to slash emissions from new and existing coal- and gas-fired power plants, pushing owners to either close them or outfit them with carbon capture technology or clean hydrogen fuel. *The requirements change depending on the plant's use and technology, but the largest plants would have to either close or capture emissions by 2040.*

Source: USEPA; E&E News

***Data Source:***
Global Energy Monitor

# China: New Coal Plant Capacity Added per Year (GW)

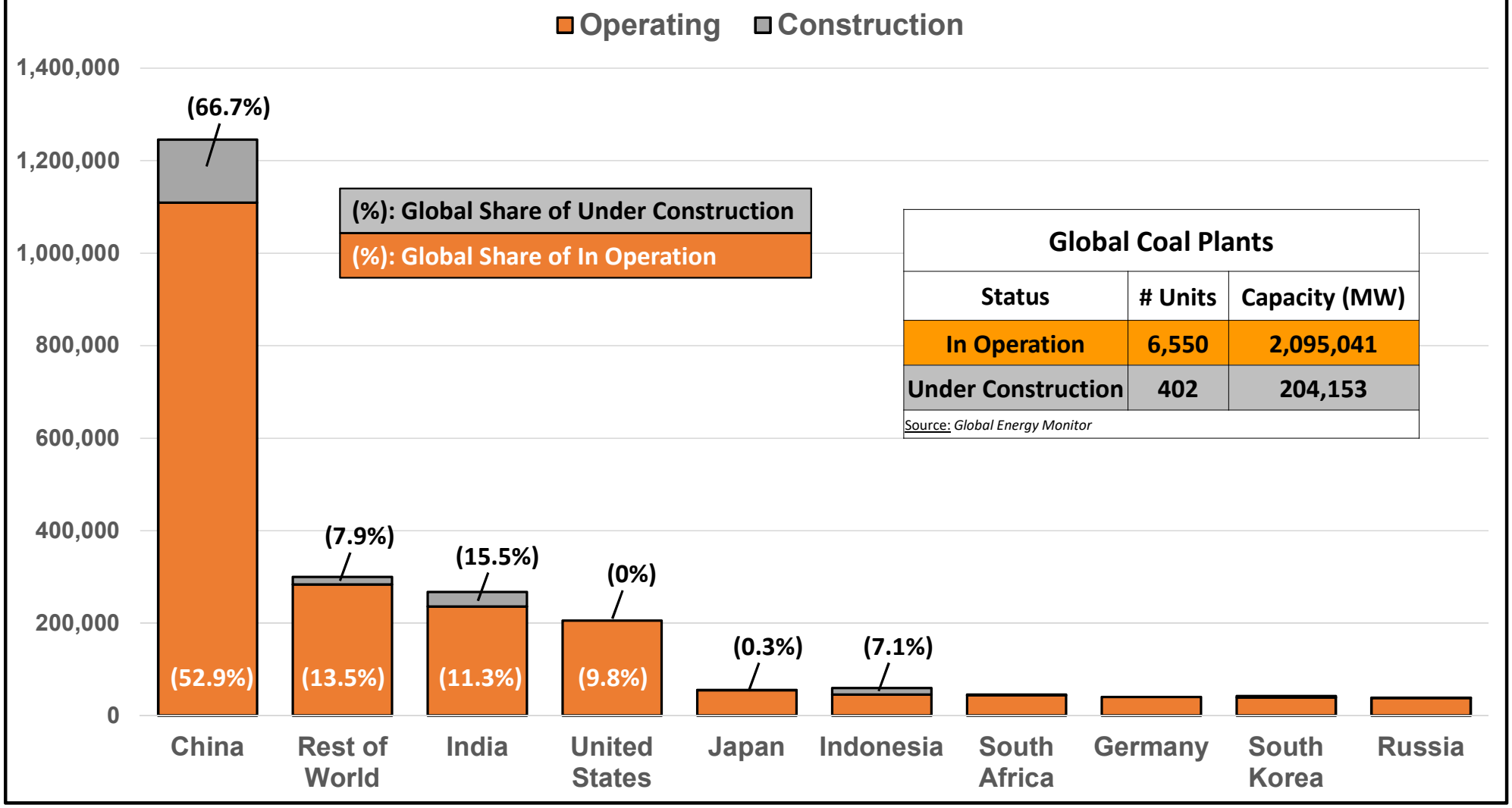
**Compiled By:** David Gattie



***Data Source:***
Global Energy Monitor

# Coal Plants in Operation & Under Construction (MW)

**Compiled By:** David Gattie




**Global Coal Plants**

| Status | # Units | Capacity (MW) |
|---|---|---|
| In Operation | 6,550 | 2,095,041 |
| Under Construction | 402 | 204,153 |

Source: *Global Energy Monitor*

# Fundamental Differences in Energy Strategy

## THE U.S.

- Executive Order 14008 (January 27, 2021)
  - *"Putting the Climate Crisis at the Center of United States Foreign Policy and National Security"*
- America's National Security Strategy (October 12, 2022)
  - "Climate" is defined as *"the greatest and potentially existential for all nations"*
  - *"Combatting the climate crisis, bolstering our energy security, and hastening the clean energy transition is integral to our industrial strategy, economic growth, and security. Events like Russia's war of aggression against Ukraine have made clear the urgent need to accelerate the transition away from fossil fuels"*

## CHINA

- Xi Jinping's speech to the CCP (January 24, 2022)
  - *"Reducing emissions is not about reducing productivity, and it is not about not emitting at all, either…the gradual withdrawal of traditional energy must be based on the safe and reliable replacement by new energy. This in practice means less restrictions on fossil fuel."**
- Xi Jinping's "Report to the 20th National Congress of the Communist Party of China" (October 16, 2022)
  - *"Based on China's energy and resource endowment, we will advance initiatives to reach peak carbon emissions in a well-planned and phased way in line with the principle of building the new before discarding the old".*

* https://www.theguardian.com/world/2022/jan/26/xi-jinping-warns-chinas-low-carbon-ambitions-must-not-interfere-with-normal-life

# Industrial Base Implications

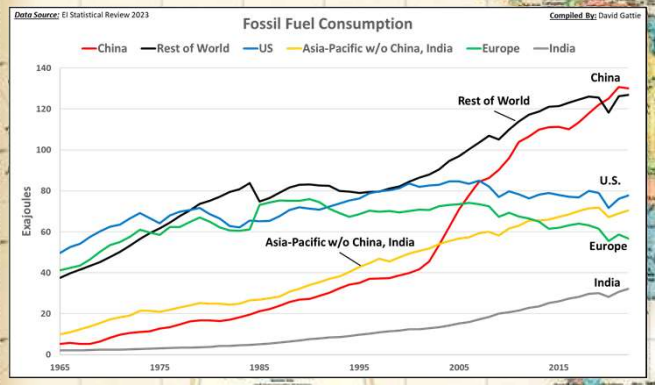
*AMERICA AND ITS COMPETITORS*

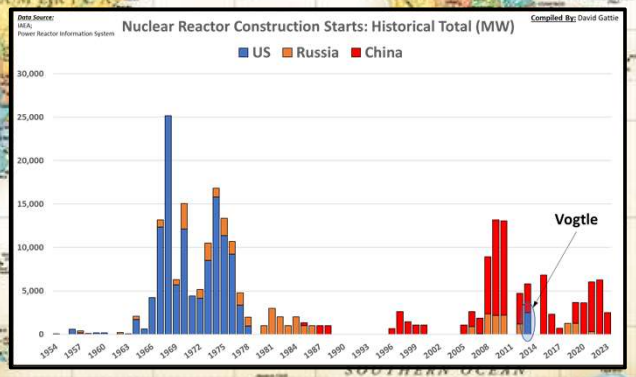
# A Contrast in Perspective & Strategy

*Climate Change* is at the Center of U.S. Foreign Policy and National Security

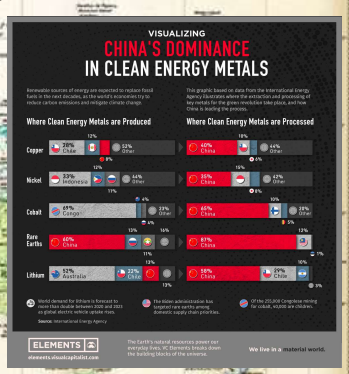

**Russia**
**Oil, Gas, Nuclear**

**China BRI**
**Coal, Nuclear, Solar & Battery Supply Chain, Financing**





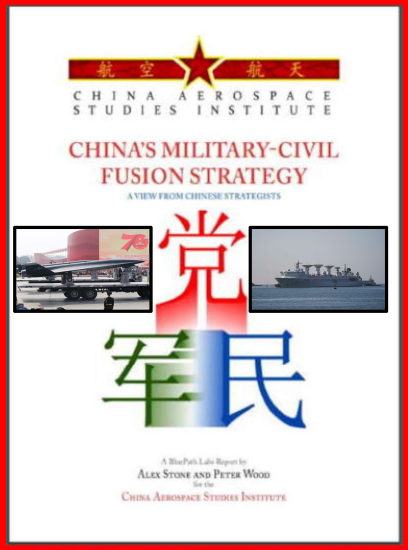



OTR Freight
https://www.fleetequipmentmag.com/us-bank-freight-payment-index-shipments/


Mining
Oil, Natural Gas,
Coal, Uranium,
Minerals, Metals
https://resource-erectors.com/career-blog/integrated-operations-management-in-minerals-metals-and-mining/


Natural Gas-Fired Power Plants


Nuclear Power Plants


CHINA AEROSPACE STUDIES INSTITUTE
CHINA'S MILITARY-CIVIL FUSION STRATEGY
A VIEW FROM CHINESE STRATEGISTS
军民
A BluePath Labs Report by
Alex Stone and Peter Wood
for the
China Aerospace Studies Institute


Electric Power Grid
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Rail and Shipping
https://www.cato.org/publications/policy-analysis/jones-act-burden-america-can-no-longer-bear


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Cement Production
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Coal-Fired Power Plants
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Chemical Production
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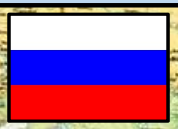
Iron and Steel Forging
https://www.steel.org/steel-technology/steel-production/


Oil and Natural Gas Refining

# Which Industrial Base Has the Relative Advantage?




**Industrial Strategy**
**Energy Transition**


**Industrial Strategy**
**All Energy Resources**

# National Security Concerns

*AMERICA AND ITS COMPETITORS*

# National Security Concerns

1. China and Russia are strategically exploiting fossil fuel resources and technologies and leading in nuclear deployment as the U.S. debates moving away from fossil fuels and as developing economies move in the same direction as China, Russia and other authoritarian states
   - Asymmetric shift in energy resources, energy technologies and industrial bases relative to great power competitors

# National Security Concerns

2. If the U.S. decarbonizes its economy by transitioning away from fossil fuels in an effort to battle global climate change, what is the U.S. climate return on that investment?
3. Will policymakers in China and Russia subject their respective energy enterprises, industrial bases and state-owned enterprises to an all-in effort to reduce carbon emissions and solve the climate crisis?

# *America's Proposed Energy Transition*

*The U.S. is proposing an industrial strategy/policy to decarbonize its economy and transition away from fossil fuels, at a time when we're facing what are arguably the greatest geopolitical challenges in our country's history*

*Can the U.S., with its industrial base restructured around low- and zero-carbon energy, retain its 20th century economic, military, industrial and geopolitical advantage relative to 21st century strategic competitors and outcompete China and deny the CCP of its intentions to disrupt a rules-based international order?*

# Thank You

# Additional References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