

Why the Markets for Upgraded Densified Products Produced from Bioresources Exist

Presented by William Strauss, PhD, President, FutureMetrics

September 24, 2025

The poster features a grayscale aerial photograph of a city harbor with numerous buildings and a waterfront. Overlaid on the left side is the text 'Wood Pellet Association of Canada Conference' in large, bold, white sans-serif font. Below this, in a smaller white font, is 'September 23 - 24, 2025', followed by 'Halifax Marriott Harbourfront' and the address '1919 Upper Water St, Halifax, NS B3J 3J5'. In the bottom right corner, there is a logo consisting of a red maple leaf inside a green circular frame, with the text 'WOOD PELLET ASSOCIATION OF CANADA' below it. Above the logo, the words 'Presented by' are written in a small white font.

**Wood Pellet
Association of
Canada Conference**

September 23 - 24, 2025
Halifax Marriott Harbourfront
1919 Upper Water St, Halifax, NS B3J 3J5

Presented by

WOOD PELLET
ASSOCIATION OF CANADA

FutureMetrics - Consultants to Many of the World's Leading Companies with Interests in the Wood Pellet Fuel Sector



Hawkins Wright's presentation by Fiona Matthews and the presentation by Marta Imarisio from Argus will do deeper dives into markets and policy.

This presentation will set the context for why these markets exist and why they will expand.

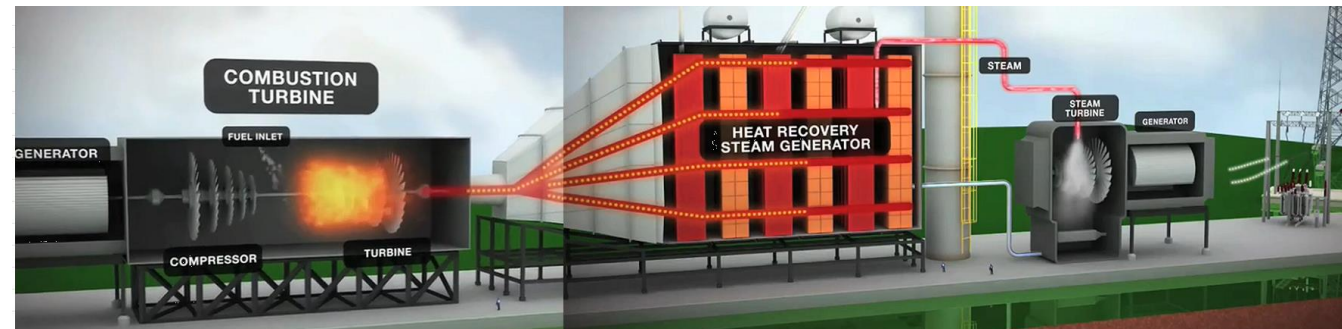
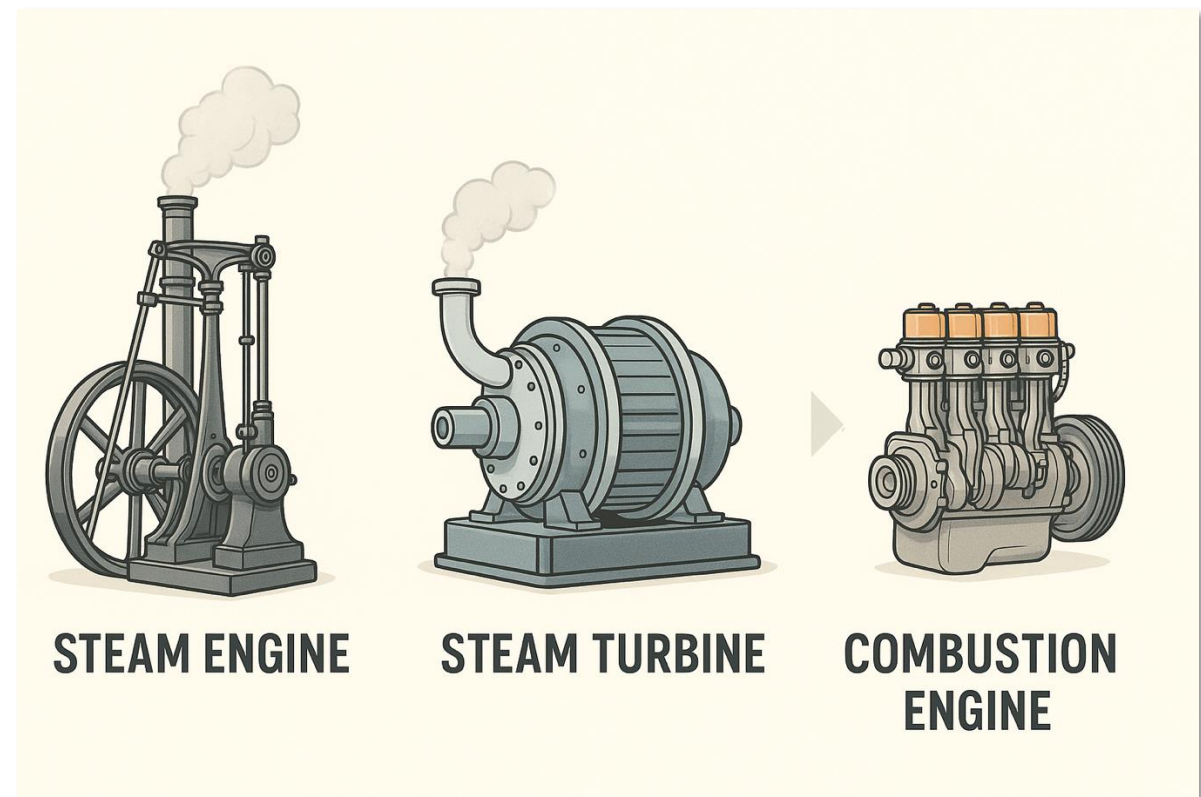
First, how did we get here?

- Not that long ago the best that humans could do to increase productivity was to engage lots of humans (often slaves) and use large animals to pull heavy loads.
- As humans innovated, where geography allowed, waterpower milled grains and eventually powered machines in factories with lots of shafts, pulleys, and belts.



ChatGPT did not quite get the belts right!

- Just a few hundred years ago, reciprocating pistons driven by steam were a huge breakthrough in generating power.
- Beginning in the 1800's the use of a very energy dense solid fuel, **coal**, evolved into the dominant supplier of primary energy for factories, railroads, and shipping.
- Spinning turbines driving generators no longer needed to be on a river or dam. Steam turbines powered by coal fueled boilers, and more recently combustion turbines, allowed electrification to expand rapidly.
- The evolution of energy dense liquid fuels produced from another mineral, petroleum, changed everything.



Combined Cycle Gas and Steam Turbines and Generators

Fossil fuels underpinned a great leap forward in global standards of living.

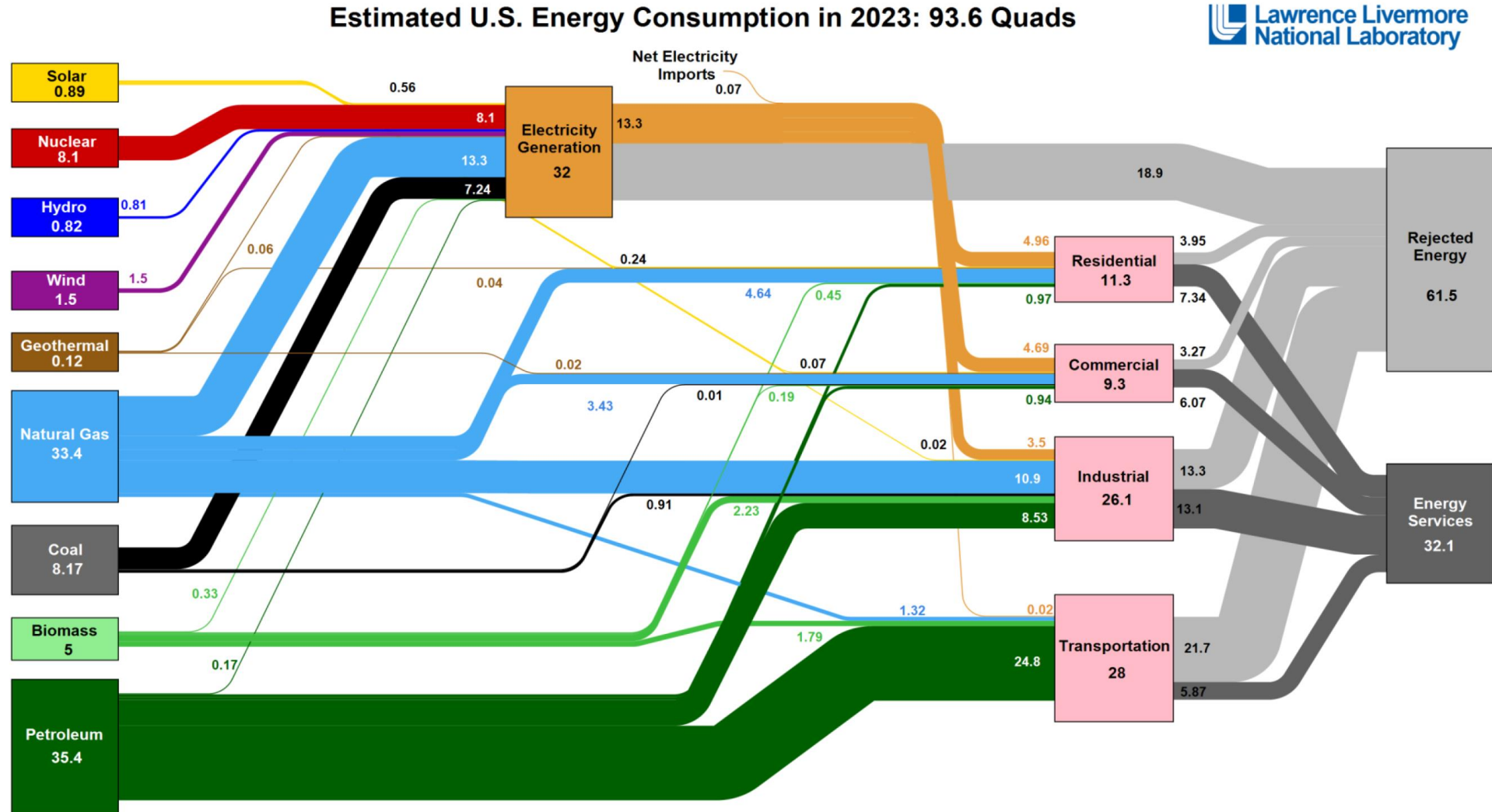
Of course we want to keep doing what we have been doing.

Most of the comforts and conveniences of modern living are supported by energy from fossil fuels.

But for clear and present reasons, we cannot keep doing what we are doing.

Some common types of energy carriers approximately equal to 1 quad are:

- 8,007,000,000 gallons (US) of gasoline
- 293,071,000,000 kWh
- 293.07 terawatt-hours (TWh)
- 33.434 gigawatt-years (GWy)
- 36,000,000 tonnes of coal
- 970,434,000,000 cubic feet of natural gas
- 5,996,000,000 UK gallons of diesel oil
- 25,200,000 tonnes of oil
- 252,000,000 tonnes of TNT
- 12.69 tonnes of uranium-235 (with 83.14 TJ/kg)
- **6 seconds of sunlight reaching Earth**

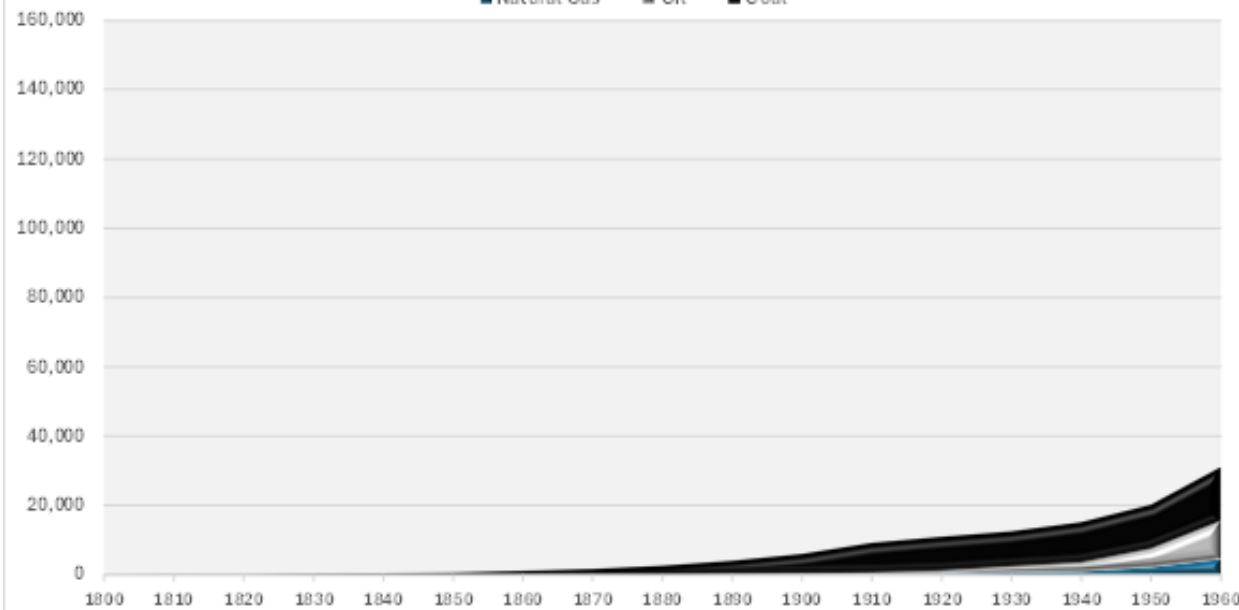


Why we need to transition away from extracted carbon rich resources.

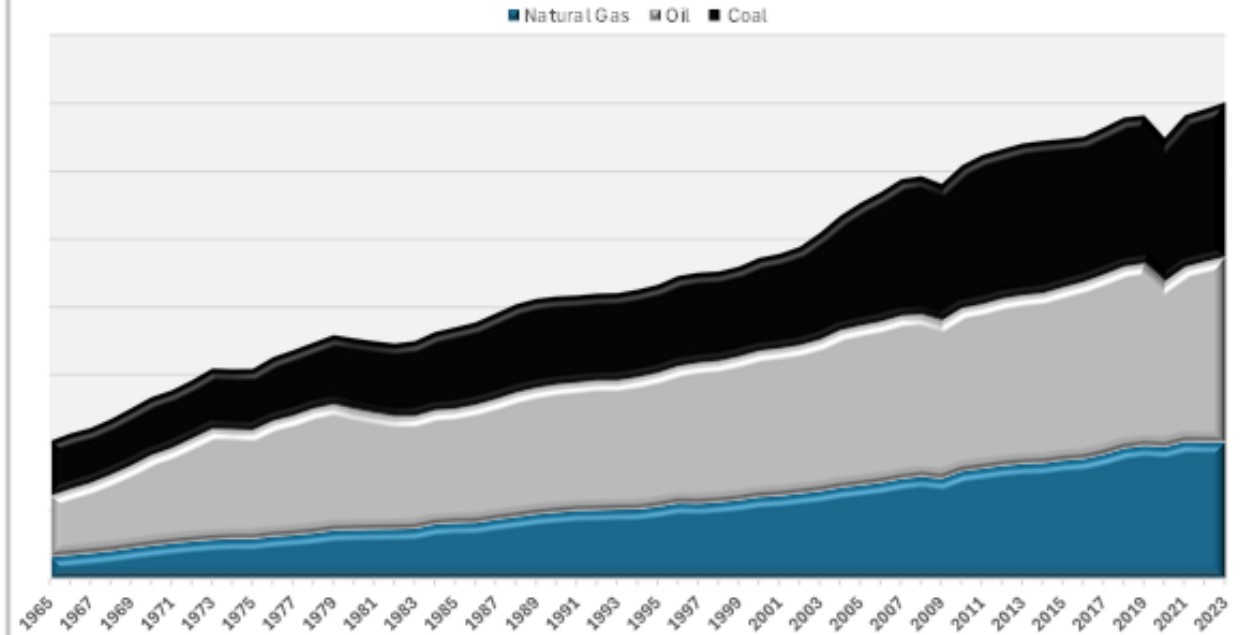
- They are depleting resources. When they are gone, what is next?
- Their use is releasing carbon sequestered over millions of years in just a few hundred years. The consequences of this are dire.

These geologic resources will be depleted.

Global Fossil Fuel Use 1800 to 1960
(in terrawatt-hours of primary energy consumption)



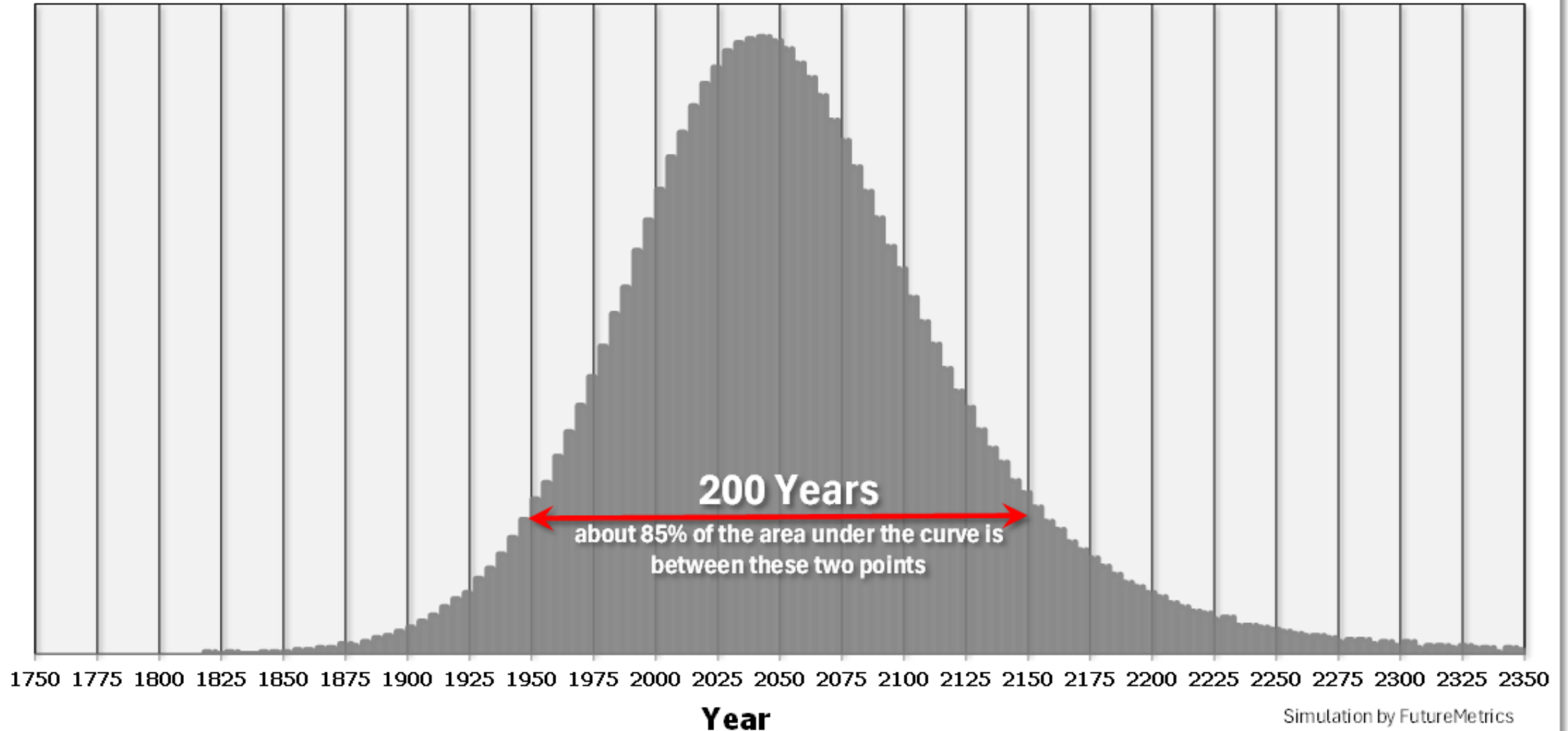
Global Fossil Fuel Use 1965 to 2023
(in terrawatt-hours of primary energy consumption)



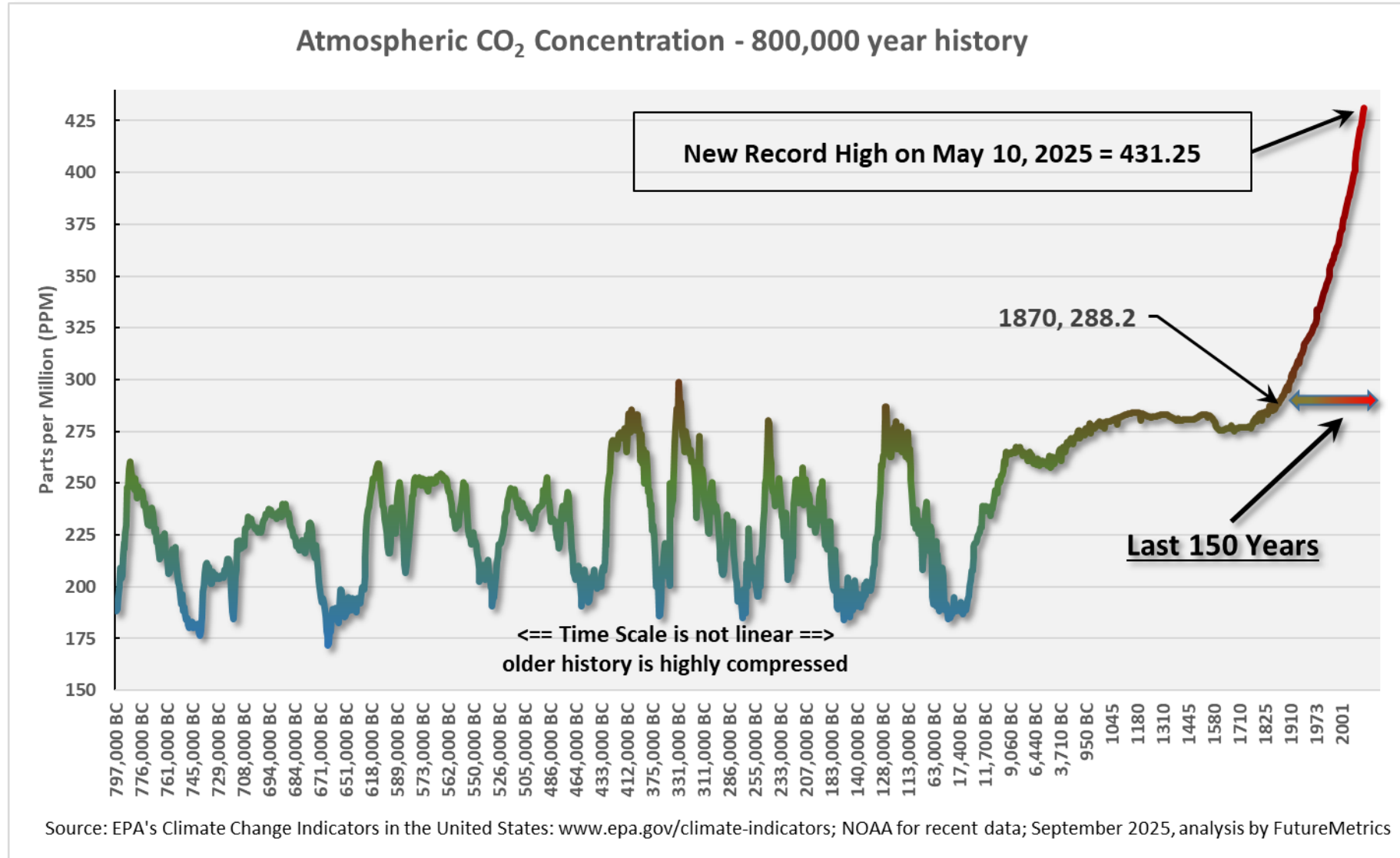
**The path to depletion means
increasing scarcity and rising prices.**

The fossil fuel age will end and on the way to depletion geologic energy resources will become increasingly scarce.

The Fossil Fuel Age (no worries about CO₂ emissions)

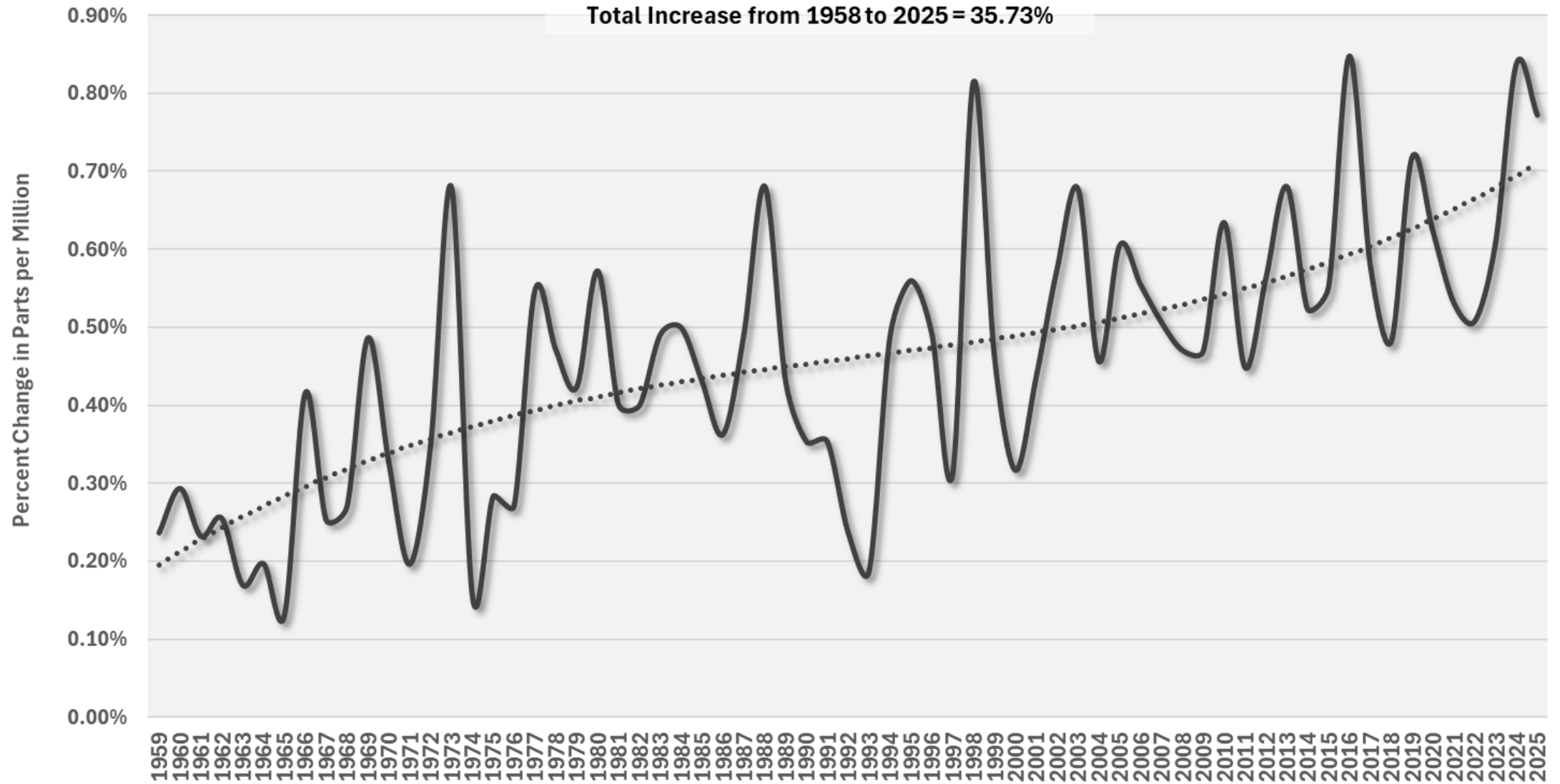


Over a period of just a few hundred years, carbon sequestered into geologic formations over millions of years is being moved into the atmosphere.



Percent Increase in Annual Average Atmospheric CO₂ Concentration

Total Increase from 1958 to 2025 = 35.73%

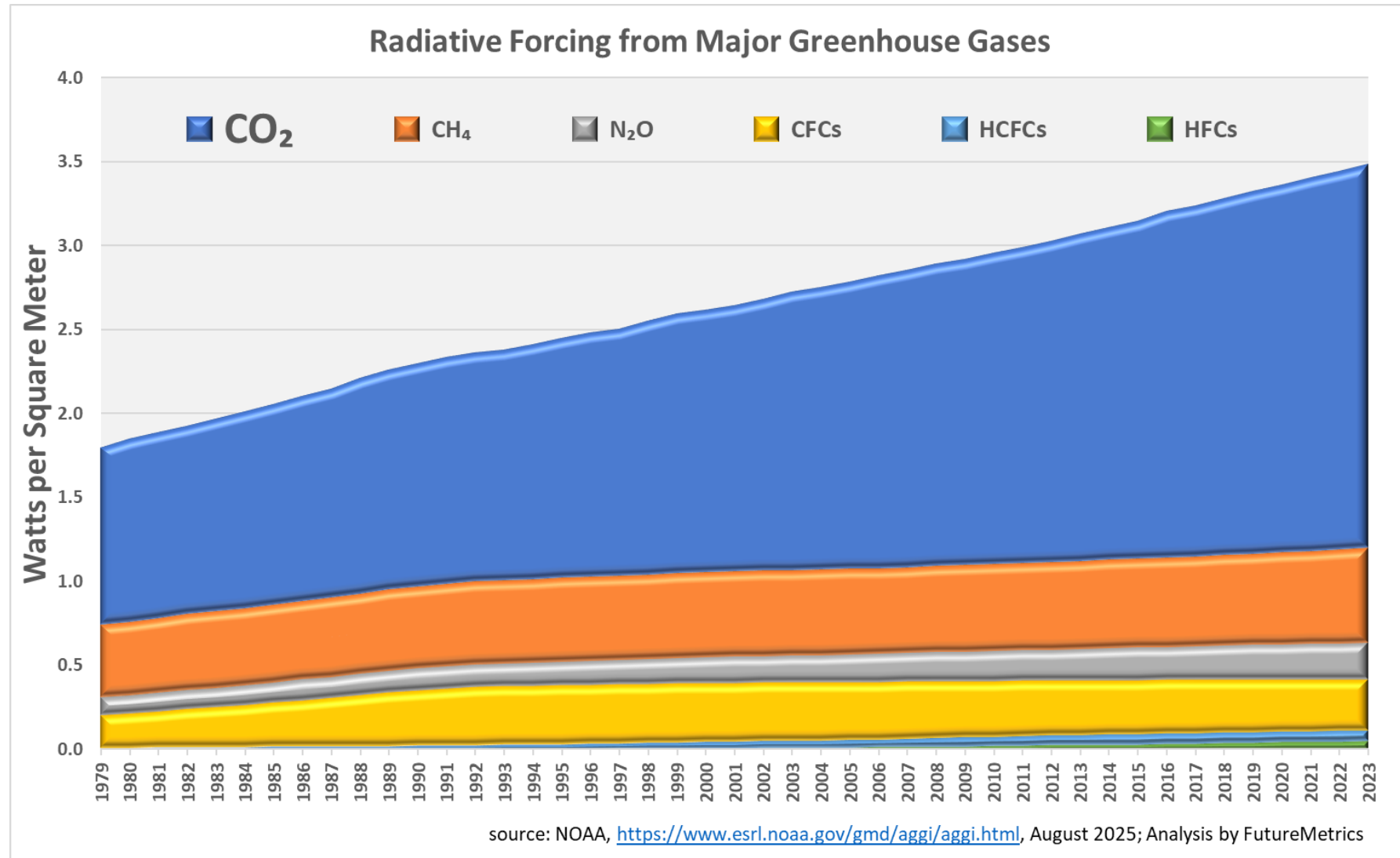


source: NOAA https://gml.noaa.gov/webdata/ccgg/trends/co2/co2_mm_mlo.txt; Analysis by FutureMetrics

Greenhouse gas (GHG) *radiative forcing* in watts per square meter is a measure of how much additional energy greenhouse gases trap in the Earth's climate system.

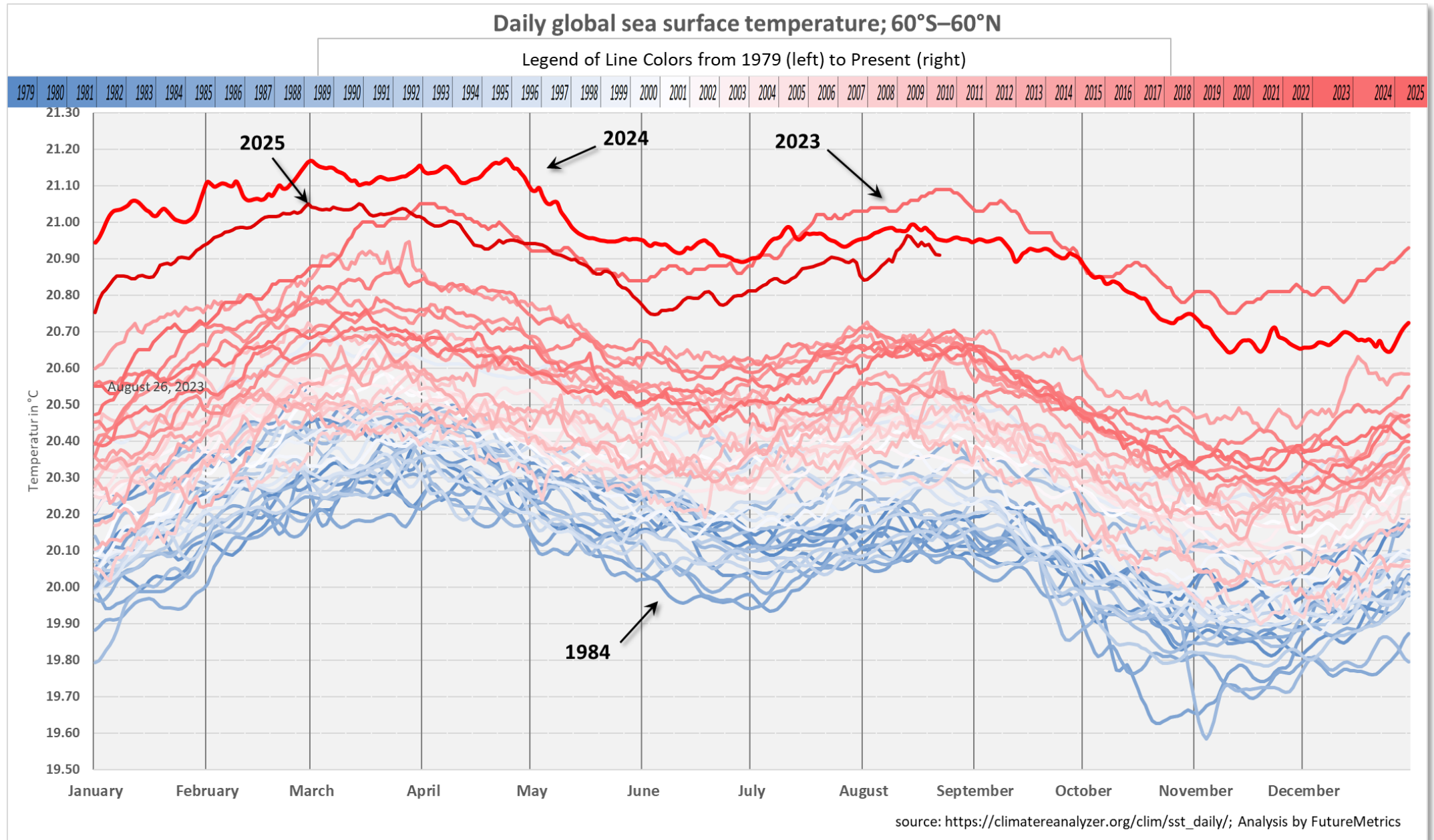
It quantifies the imbalance between

incoming solar radiation and outgoing infrared (heat) radiation caused by increases in the gases shown in the chart.



The impact of CO₂ concentrations (increasing at an increasing rate!)...

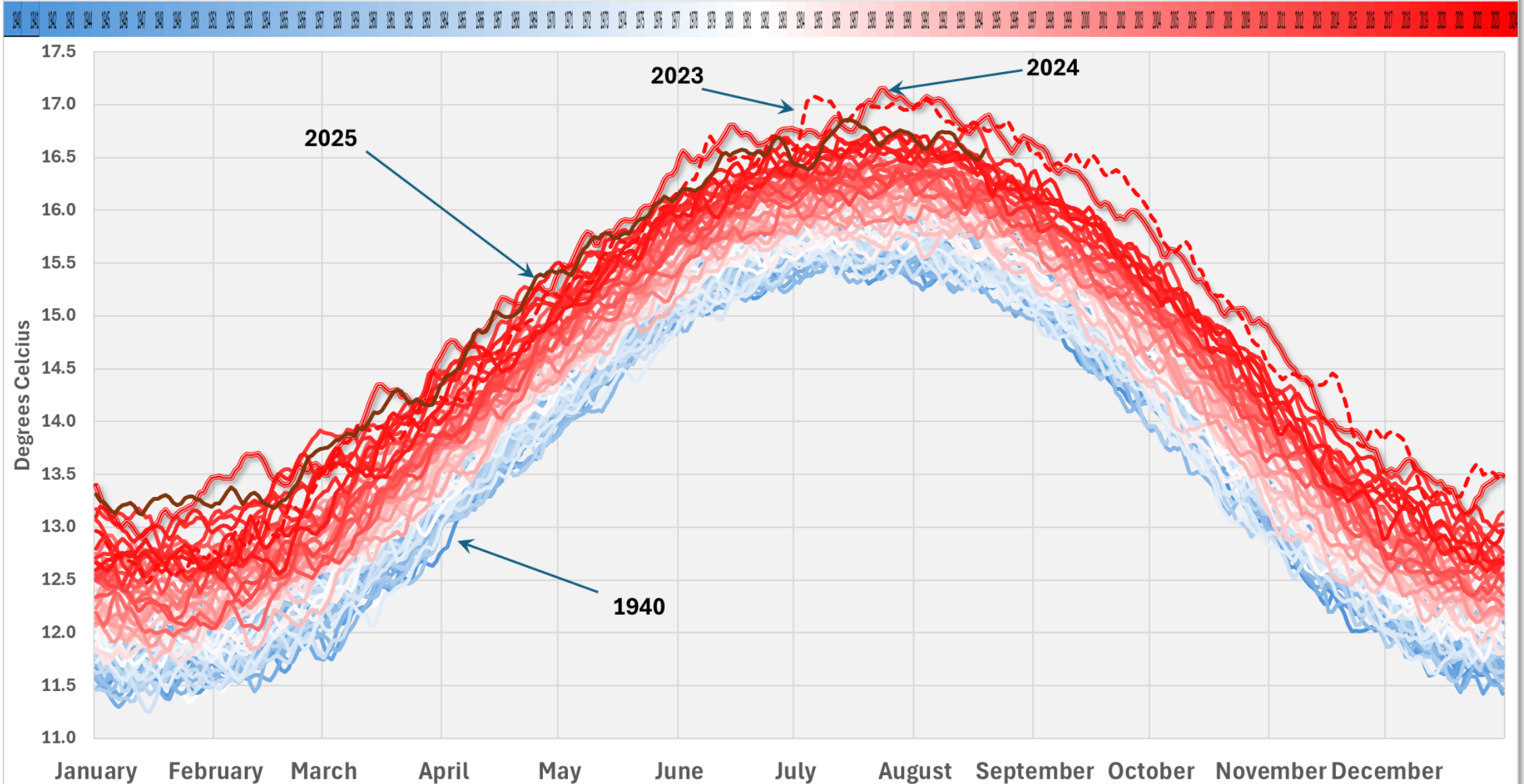
Have we passed a tipping point already?



Daily Air Surface Temperatures, World

<== from 1940 to present ==>

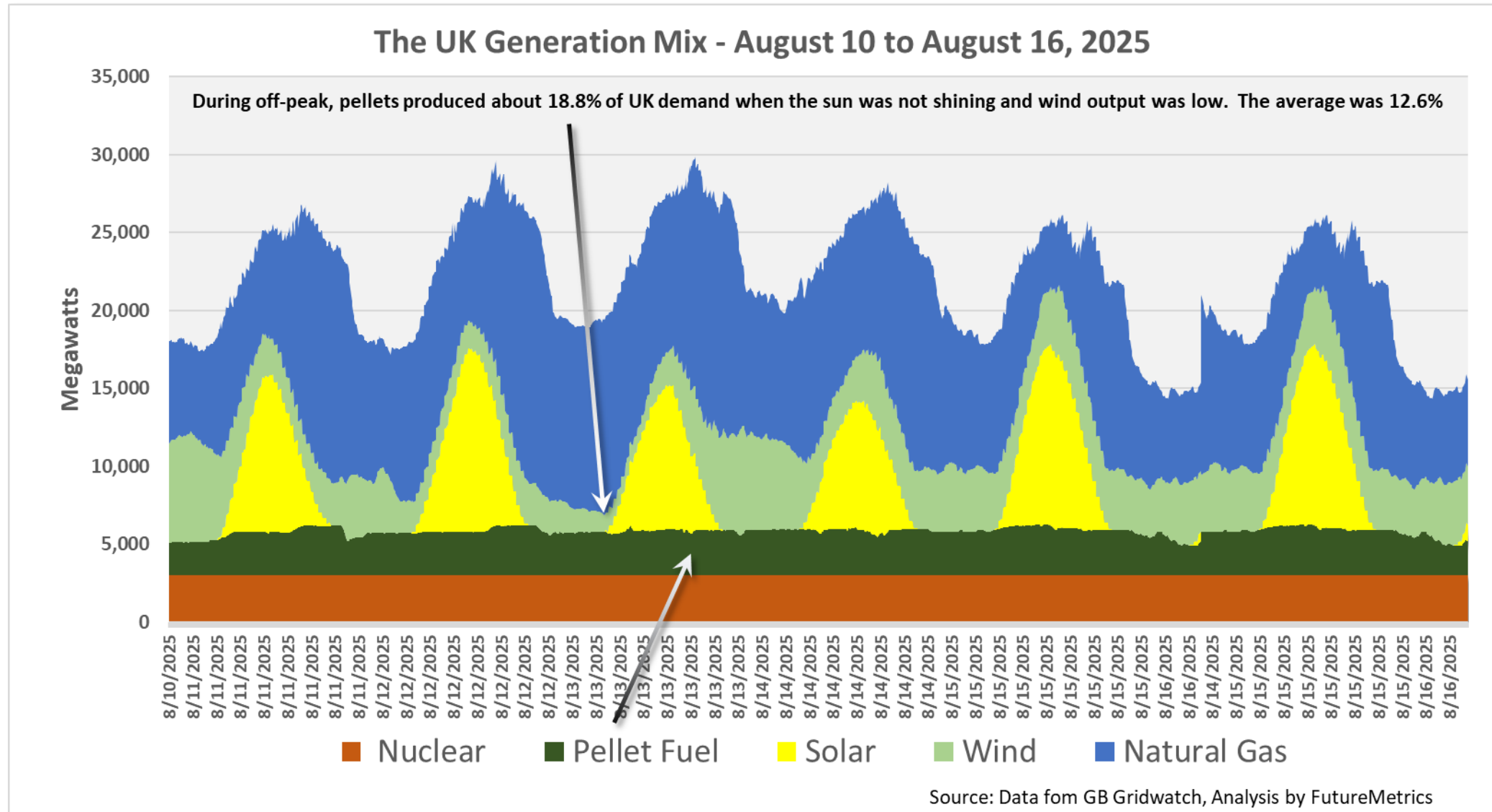
[color code by year from dark blue=1940 to dark red = present]



A rational strategic plan requires the transition from a depleting finite resource.

A rational strategic plan requires the clear recognition that CO₂ emissions are dangerous pollution.

This industry is already doing this in the heat and power generation sector in some countries!

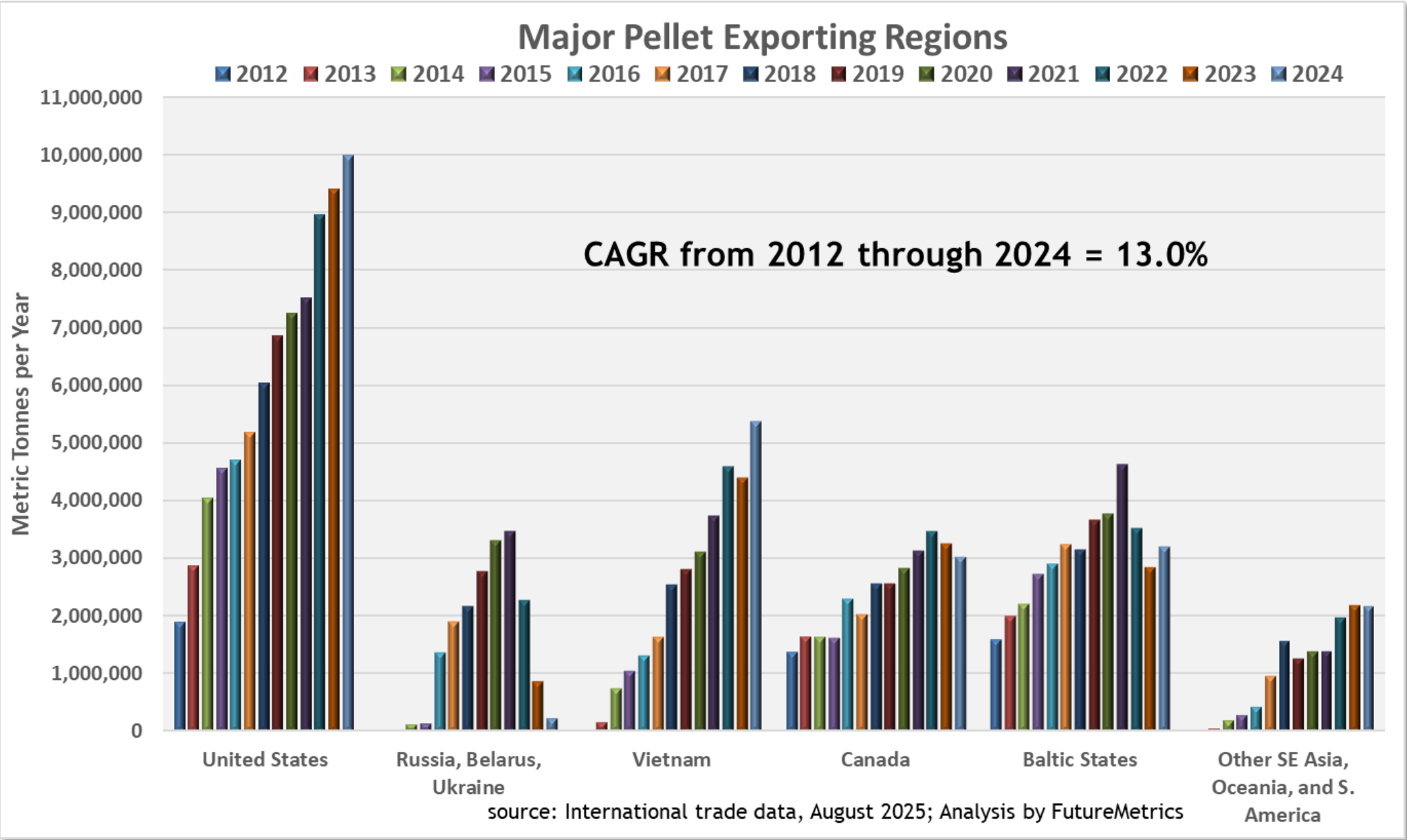


Right here in Maritime Canada, New Brunswick Power's Belledune power station will convert from coal to pellet fuel.



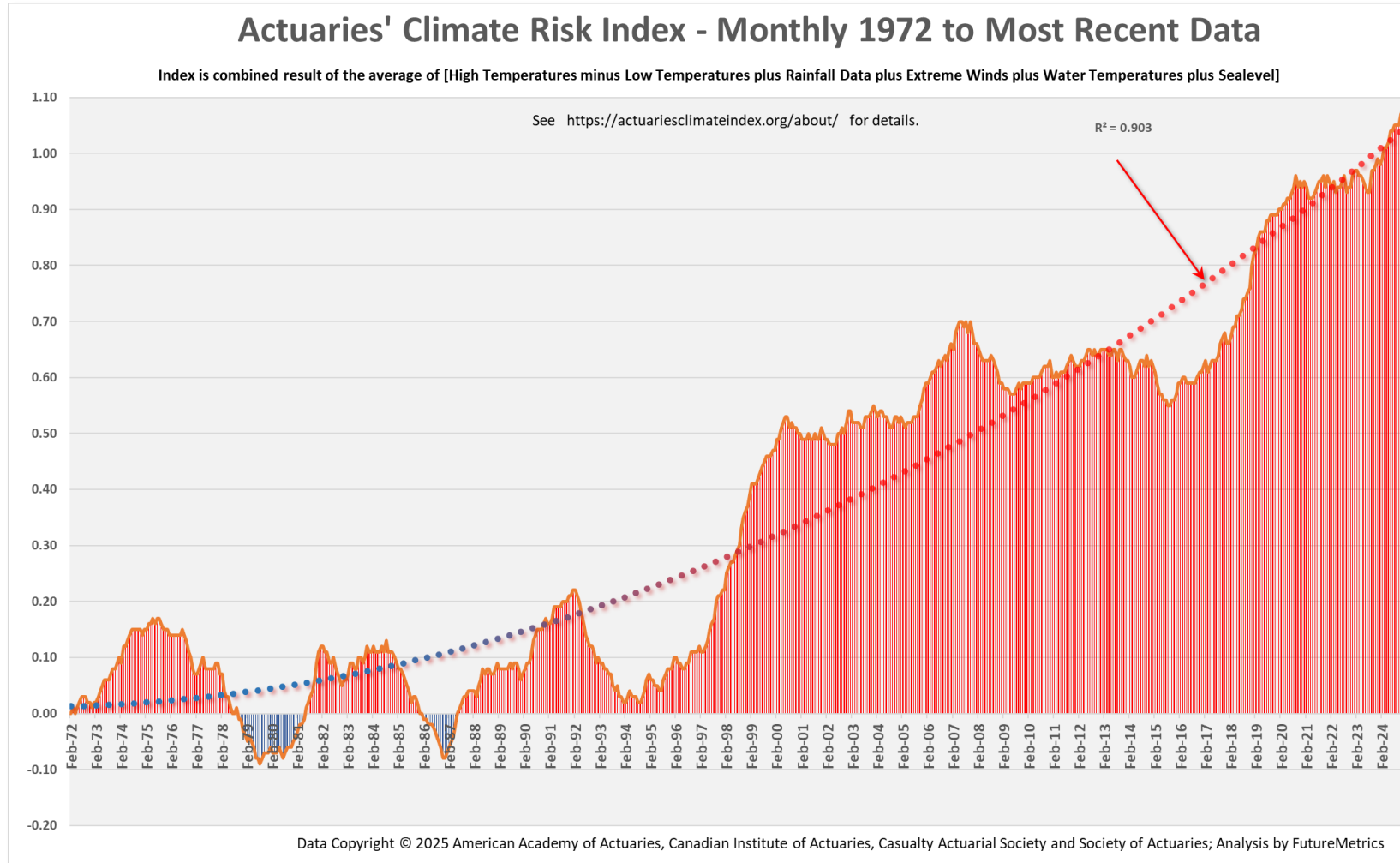
The 450 MW coal fueled power station that MUST cease coal use by 2030.

Global Trade in Pellet Fuel is Currently Around 25,000,000 Metric Tonnes per Year



If policy remains steadfast in recognizing the **costs** of increasing CO₂ levels in the atmosphere and the consequences to climate and oceans,
we will see the demand for sustainably sourced bioresources
grow across many carbon emitting sectors.

The “**costs**” are here now. And they will increase at an increasing rate in the future.



Actuaries quantify risk for insurance companies.

Higher risk translates into higher costs to protect against those risks.

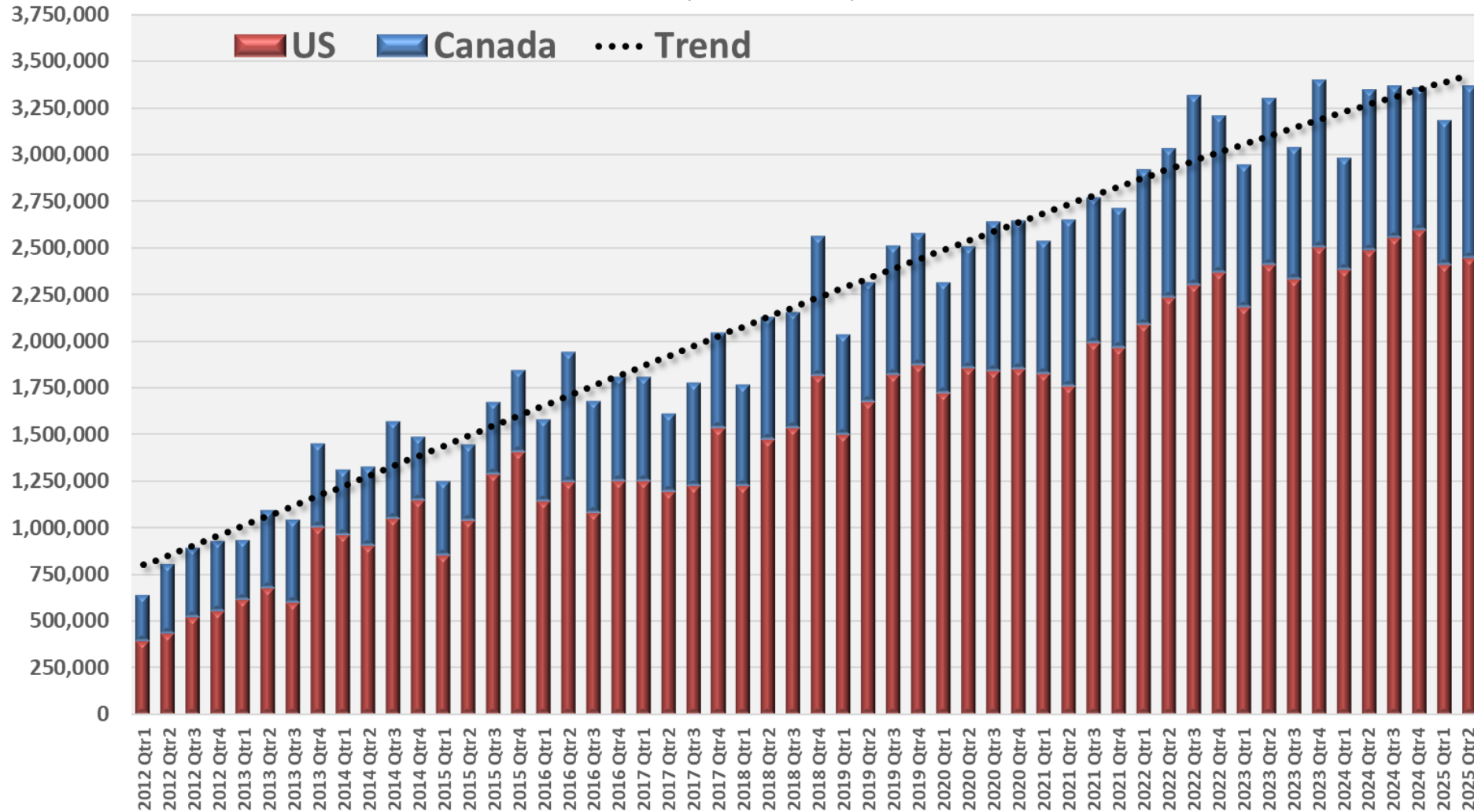
The “cost” of doing business is increasing at an increasing rate.

In some locations, property and business interruption insurance is no longer available!

The trend looks good...

But BIG changes are coming in 2027 that will impact pellet exports from north America.

Quarterly Pellet Exports from the US and Canada
(metric tonnes)



source: International Trade Data, August 2025; Analysis by FutureMetrics

Eastern Canadian producers will be impacted.

Fortunately, the NB Power conversion will soften the blow.

More on upcoming policy evolution next from Hawkins Wright.

Thank you!

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FutureMetrics LLC™



My amazing wife Sally (far left) at the top of the famous Tour de France high point, the Col de Tourmalet