

What is next for Net Zero?

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WEC Trkiye – 10 December 2023

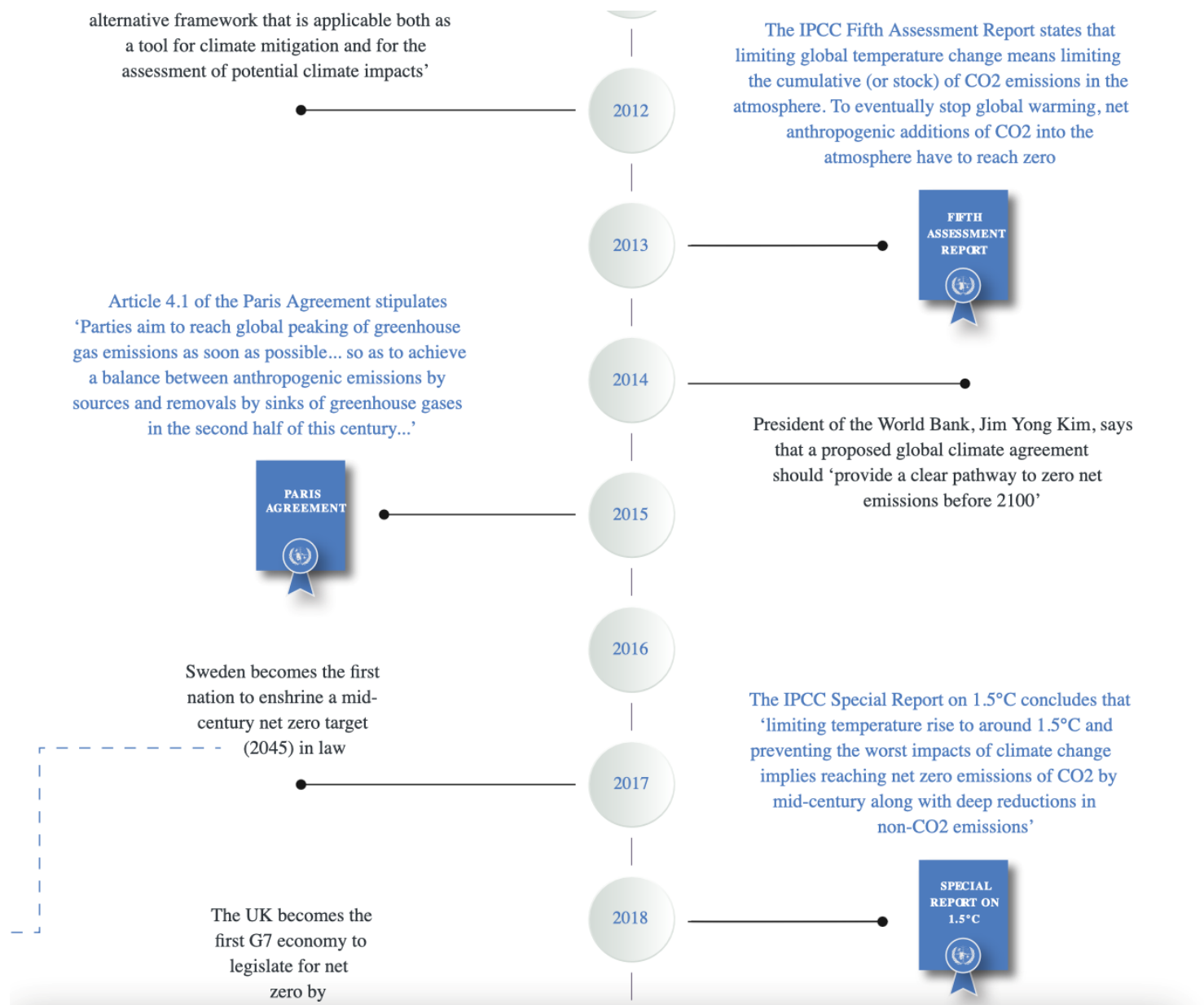
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- Net Zero trend & concept
- What is next? (COP outlook and Political Environment)
- Differences
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 - World Energy Indicators
- Why emissions are rising?
- Money Issues
- Progress Takes Time
- Wrap up

In summary – more clean tech in the pipeline

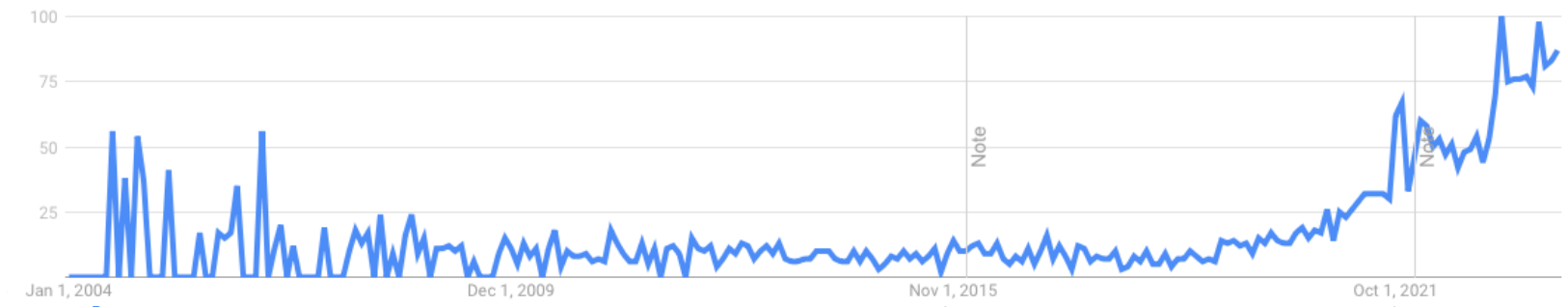
- 2024 : Elections
- 2024-25 : new concepts in circulation (IPCC)
- 2025-26 : end of shelf life for “net zero”?
- 2026 : a new concept (climate secure, orderly transition ?)
- 2028 – new “chemical/material technologies”
- 2030-32 – new mainstream technologies
- Main problems: Demand & Winter fuel security

History

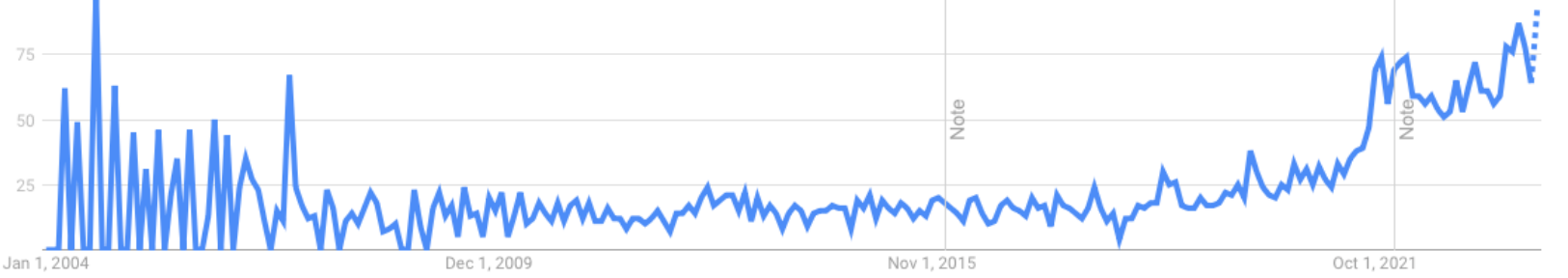


Interest in Net Zero

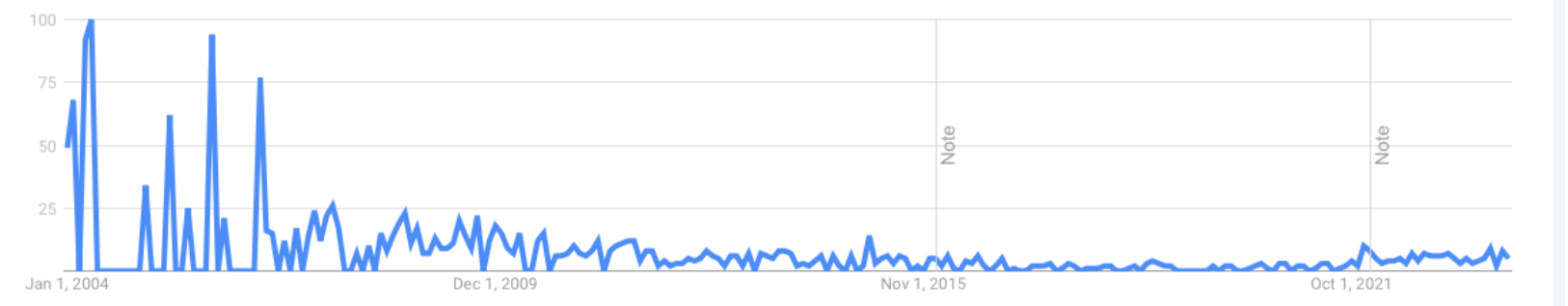
Law & Government



News



Online Communities



All Categories



Net Zero as a concept

- A simple idea: “Anyone can understand”
- Is it a packaging or are there any content to it?
- Has Zero in title (Policies with “zero” keyword are controversial)
- More political than market concept
- “Every idea has an average shelf life”
 - Like 5 years? (What happened to Industry 4.0?)
- It reflects a radical action based on science



COP outlook – Is there a trend?

- COP26 - Pledges (74 Countries for Net Zero)
- 2024 - COP29 – Azerbaijan
- 2025 - COP30 – Brazil?
- 2026 – COP31 – Australia / Türkiye?

Probably a new concept is expected by 2026.
But it will slowly show itself next year?

All speculation



Political Setting – Silence of the Rest

- US – Republican Presidential Nomination 2024 (Reagen moment?)
 - Eurasia Group : March 2024
 - Calendar is 15 July 2024
- EU
 - 6-9 June 2024
 - Greens?
 - Dutch elections
- UK
 - No later than January 2025
 - 1st Half ?



Nitrogen wars: the Dutch farmers' revolt that turned a nation upside-down

Farmers protest against nitrogen policy rules in Bilthoven in the Netherlands in October 2019. Photograph: Robin van Lonkhuijsen/ANP/AFP/Getty

In 2019, a looming crisis over pollution led the Dutch government to crack down on farm emissions. The response was furious - and offers a warning to other countries about protecting the environment without losing public trust

by [Paul Tullis](#)

It was the worst traffic jam in the history of the [Netherlands](#). From Amsterdam to Eindhoven, Rotterdam to Roermond, more than 2,000 tractors lumbered along clogged highways during the morning rush hour of 1 October 2019. Their spinning beacon lights shining amber

Thu 16 Nov 2023 06.00 CET

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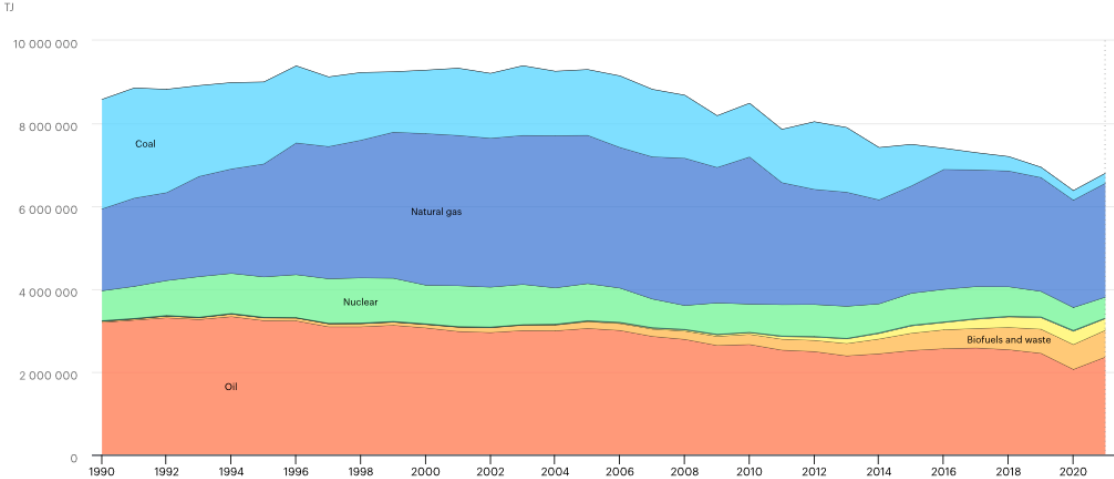
Great Divergences

- Demand stagnating vs Demand growing countries/regions
 - Europe (1/20th population) vs World
- Scenarios
 - Political vs Market based Scenarios
- Narratives vs Realities
 - “Technologies are present” vs Wind Industry
- Per capita levels to start from
 - OECD vs 5/7th World population
- Printing Money vs External Debt
- Simplified Messaging (Net Zero) vs Complex Mechanism (Queues)
- Knowledge vs Application



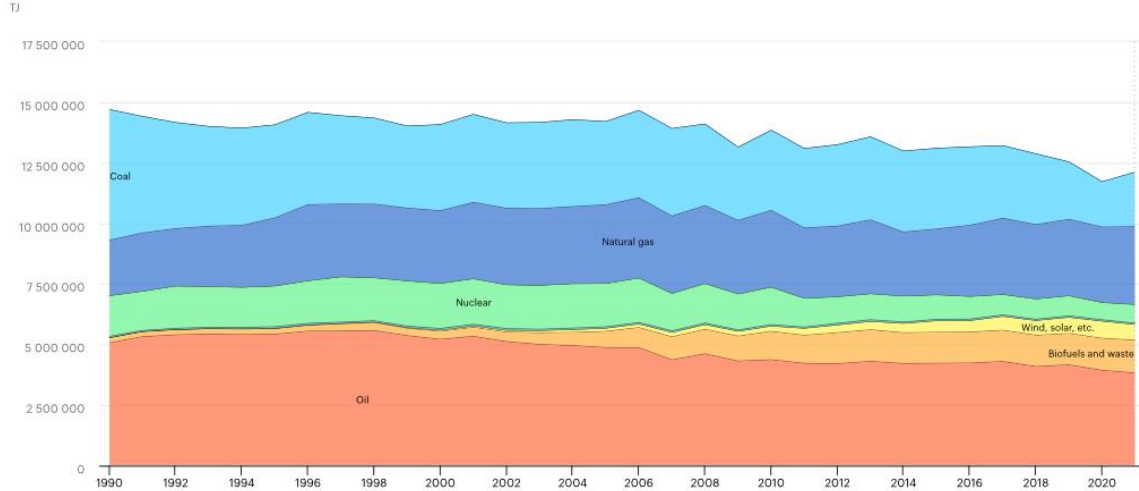
Two Countries UK and Germany

Total energy supply (TES) by source, United Kingdom 1990-2021



IEA. All rights reserved.

Total energy supply (TES) by source, Germany 1990-2021



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Different Perspectives – Vantage Points

- Activists
 - “No time, quick, close”
- Developed Economies
 - IRA, NZA, support schemes
- Oil & Gas companies
 - “Not enough returns”
- Citizens
 - “Yes we support, no we do not pay”
- Finance
 - “Make it profitable for investors”
- Industry
 - “Let’s see, we are working, but costs?”

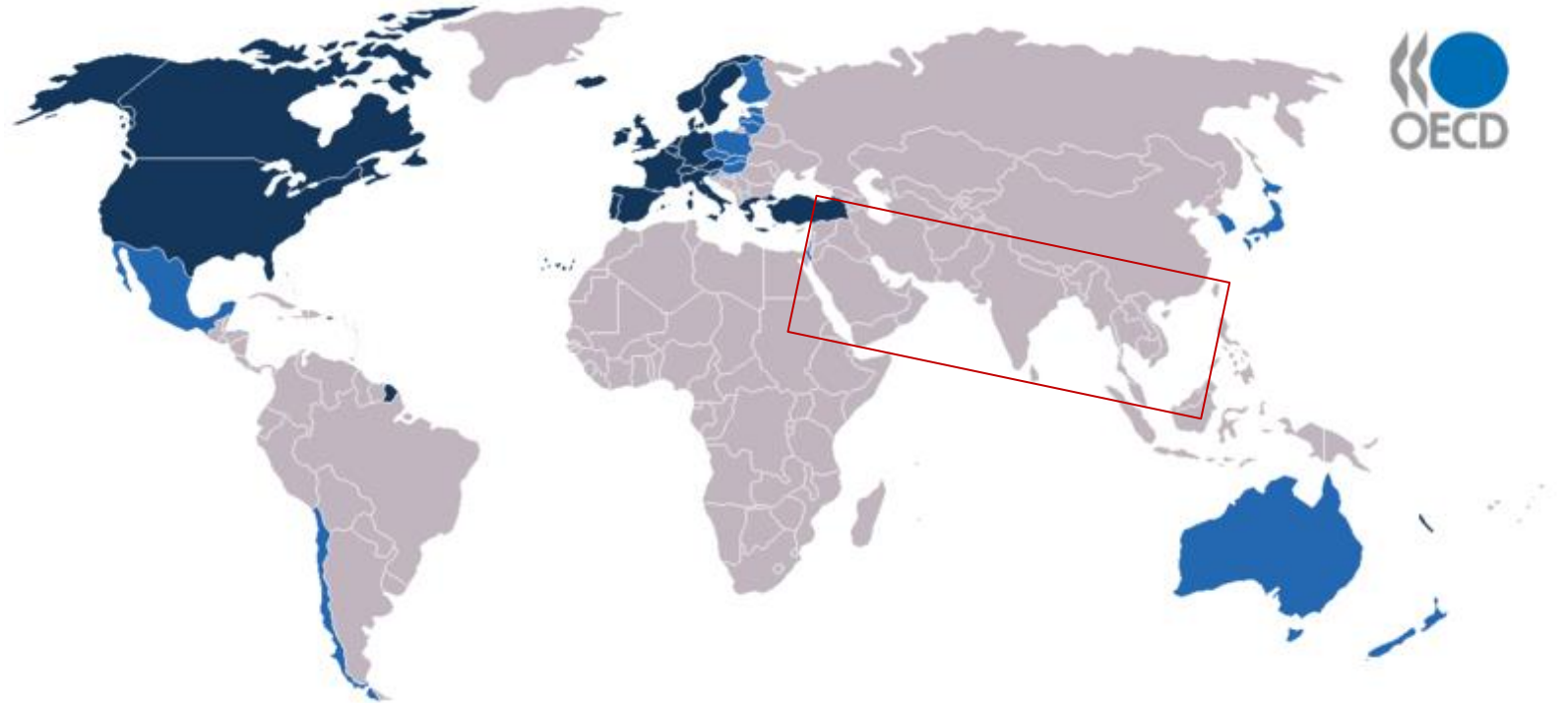


A Different World View

Populations

- India 1.4 B
- China 1.4 B
- Africa 1.4 B
- OECD 1.4 B
- EM 1.4 B
(Mid East+East Asia)
- Latin A. 0.6 B

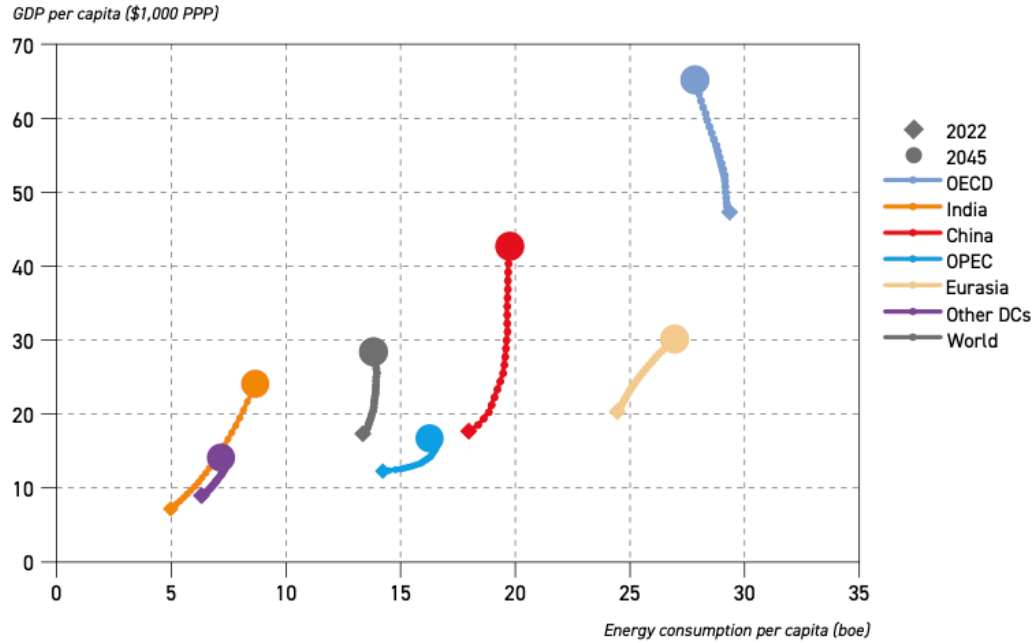
- G20 5B
- Total



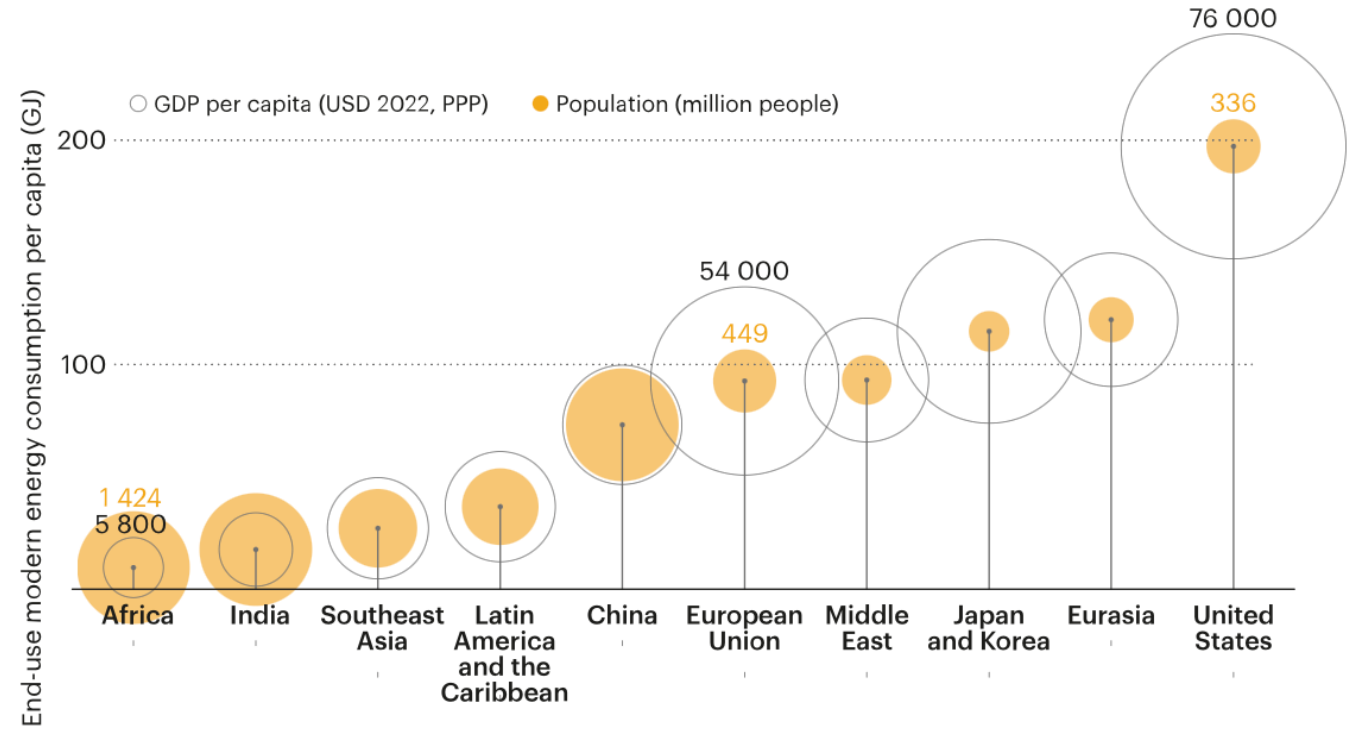
There is no such thing as a “**low energy rich country**”

Per capita

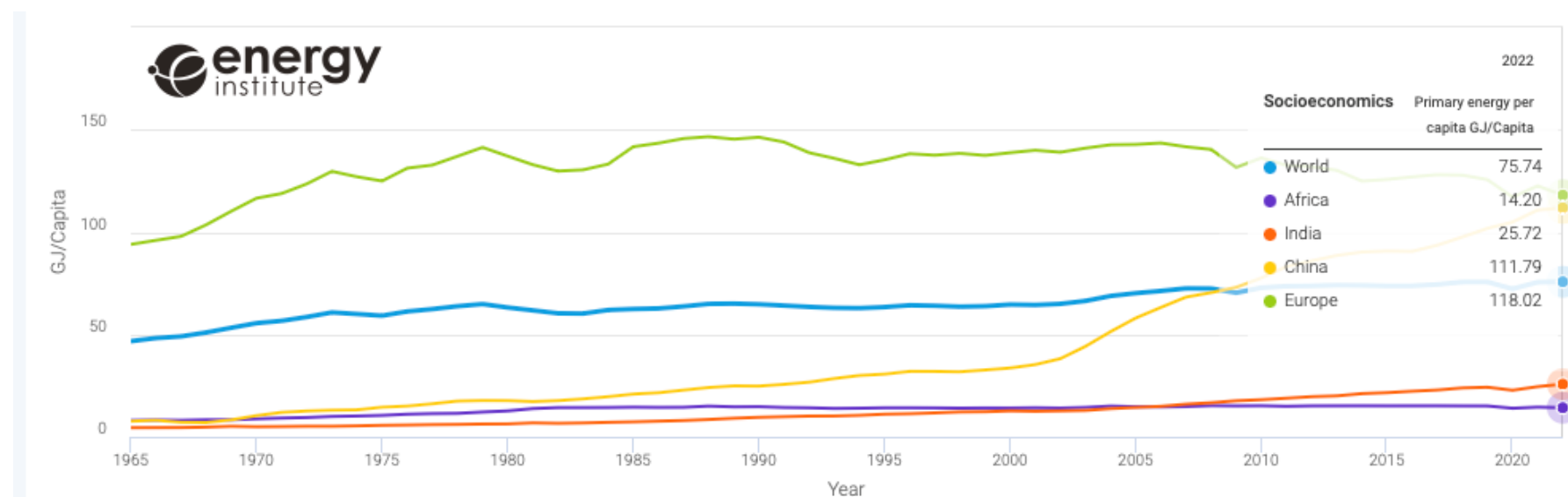
Energy consumption per capita versus GDP at PPP per capita, 2022-2045



Source: OPEC.



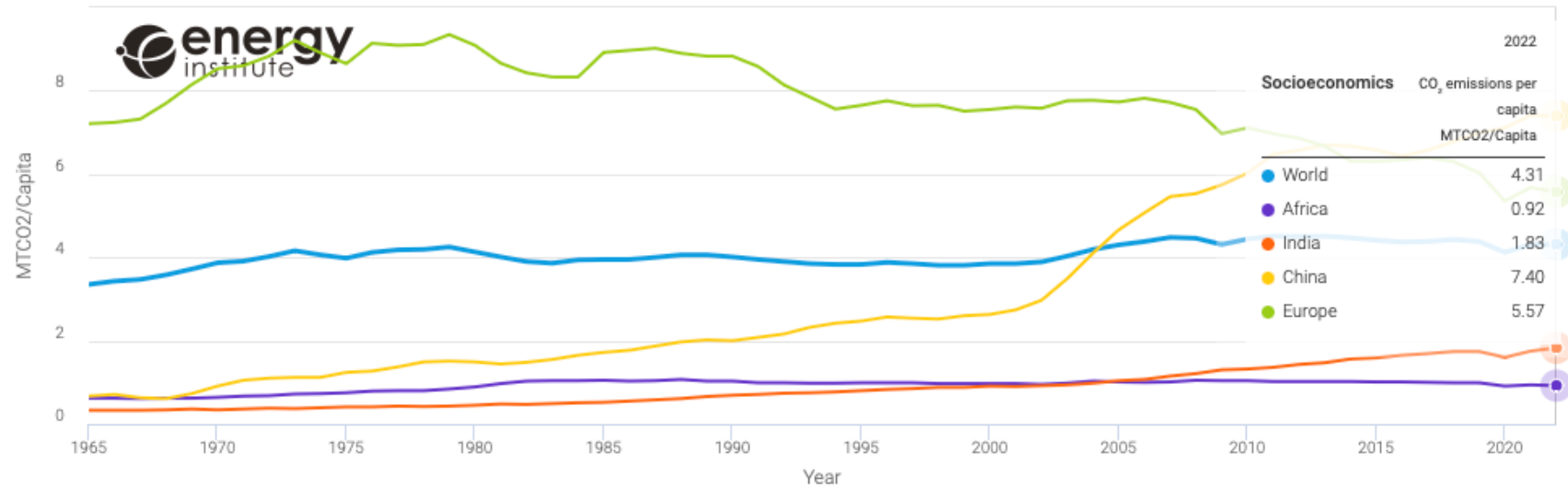
Per Capita Energy GJ/Capita



Region / Grouping	Units	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
World	Socioeconomics Primary energy per capita GJ/Capita	73.59	73.72	74.09	73.97	73.71	73.73	74.42	75.62	75.65	72.25	75.53	75.74
Africa	Socioeconomics Primary energy per capita GJ/Capita	14.92	15.12	15.14	15.16	15.13	15.14	15.15	15.10	15.08	13.94	14.50	14.20
India	Socioeconomics Primary energy per capita GJ/Capita	18.85	19.61	20.00	21.09	21.56	22.26	22.85	23.88	24.23	22.74	24.51	25.72
China	Socioeconomics Primary energy per capita GJ/Capita	83.13	85.94	88.56	90.26	90.75	90.59	93.56	97.59	101.80	104.88	110.77	111.79
Europe	Socioeconomics Primary energy per capita GJ/Capita	132.60	131.89	130.21	124.92	125.72	126.95	128.02	127.80	125.63	117.06	122.55	118.02

<https://www.energyinst.org/statistical-review/energy-charting-tool/energy-charting-tool>

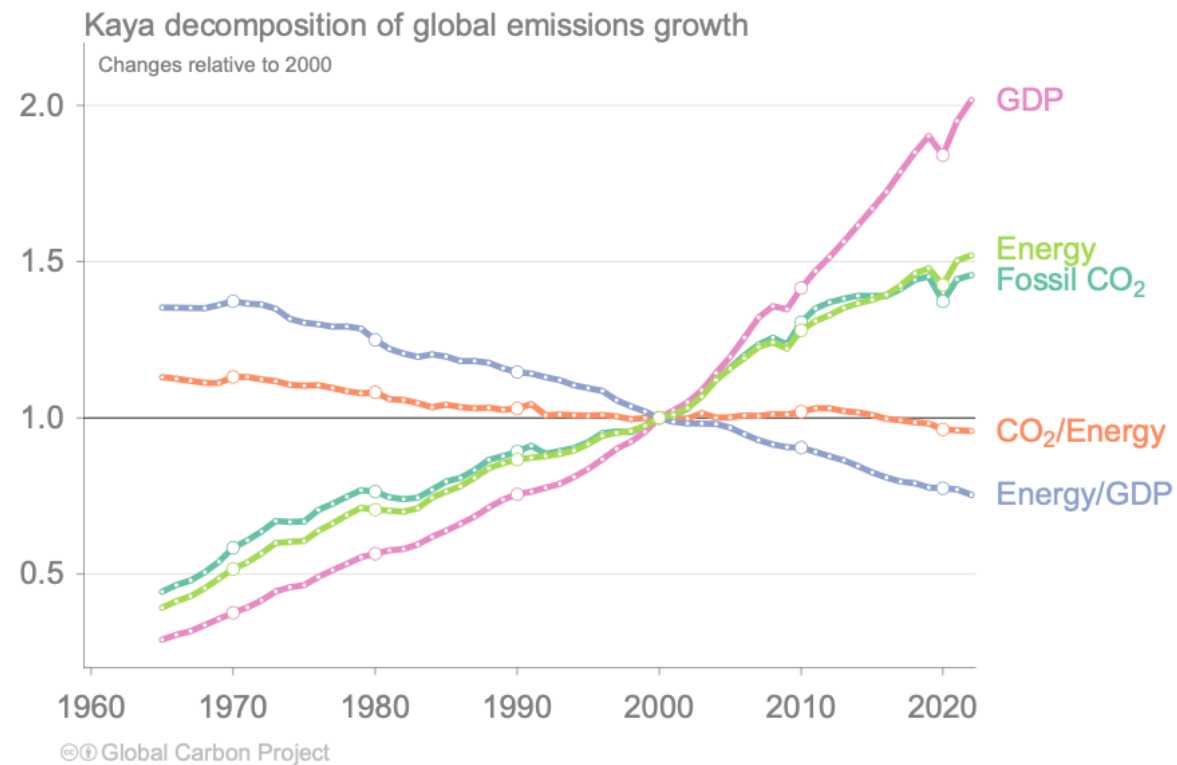
Per Capita CO₂ Emission



Region / Grouping	Units	1968	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
World	Socioeconomics CO ₂ emissions per capita MTCO ₂ /Capita	.46	4.31	4.44	4.51	4.50	4.51	4.47	4.41	4.37	4.38	4.43	4.38	4.12	4.31	4.31
Africa	Socioeconomics CO ₂ emissions per capita MTCO ₂ /Capita	.05	1.04	1.04	1.02	1.02	1.02	1.02	1.01	1.01	1.00	0.99	0.99	0.91	0.94	0.92
India	Socioeconomics CO ₂ emissions per capita MTCO ₂ /Capita	.21	1.30	1.32	1.36	1.43	1.47	1.56	1.59	1.65	1.69	1.74	1.74	1.60	1.75	1.83
China	Socioeconomics CO ₂ emissions per capita MTCO ₂ /Capita	.53	5.74	6.02	6.48	6.57	6.70	6.67	6.58	6.43	6.57	6.78	6.99	7.11	7.41	7.40
Europe	Socioeconomics CO ₂ emissions per capita MTCO ₂ /Capita	.55	6.97	7.11	6.97	6.86	6.67	6.31	6.30	6.34	6.39	6.30	6.03	5.35	5.68	5.57

Relative Decoupling

The Kaya decomposition illustrates that relative decoupling of economic growth from CO₂ emissions is driven by improved energy intensity (Energy/GDP) and, recently, carbon intensity of energy (CO₂/Energy)

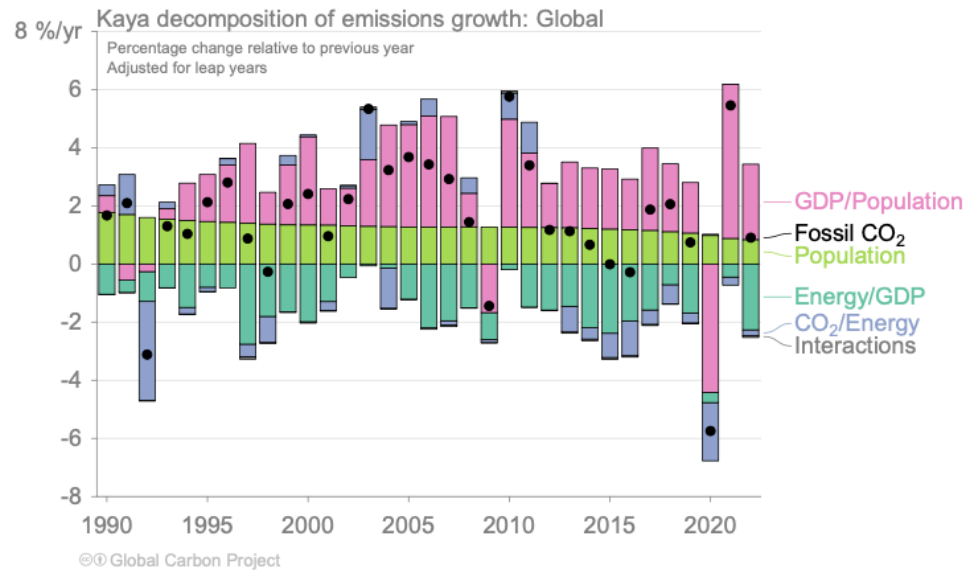


GDP: Gross Domestic Product (economic activity)

Source: [Friedlingstein et al 2023](#); [Global Carbon Project 2023](#)

Why emissions are keep rising?

Globally, decarbonisation and declines in energy per GDP are largely responsible for the reduced growth rate in emissions over the last decade. 2020 was a clear outlier with a sharp decline in GDP.



Source: [Friedlingstein et al 2023](#); [Global Carbon Project 2023](#)

<https://globalcarbonbudget.org/carbonbudget2023/>

A simple calculation – Marginal \$/MJ

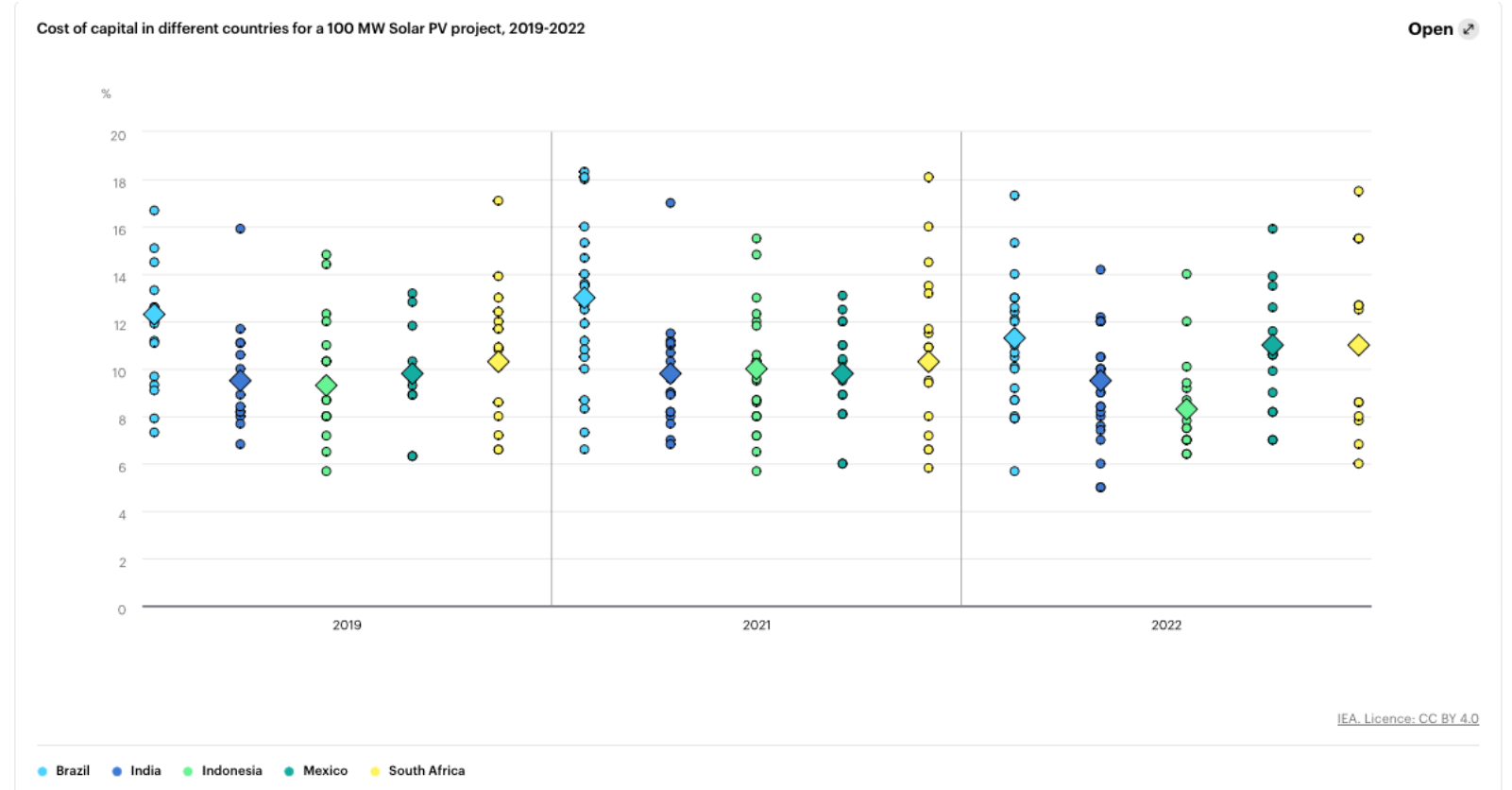
- World Energy Investment for 2022
 - + 1.4 trillion \$ for renewables
 - + 0.72 trillion \$ for oil and gas
- Increase in energy production (4% production drop in fossil fuels)
 - 4 EJ renewable supply increase
 - 16 EJ in oil and gas supply increase
 - 4 EJ in gas supply increase (compensating 4% drop)
 - 12 EJ in oil supply increase (compensating 4% drop)
- Each \$ invested
 - Renewables produce : 2.85 MJ (4/1.4)
 - Oil and gas : 22.2 MJ (16/0.72)
- Oil and gas investments are ~8 times more productive.



More energy security problems
More investment is needed

What does this mean?

- Obstacles
 - Per capita demand ("no low energy rich country")
 - Resource productivity per \$ invested (Ren vs oil&gas)
 - Mature technologies vs economic technologies
- Now
 - High interest rates
 - Not enough returns

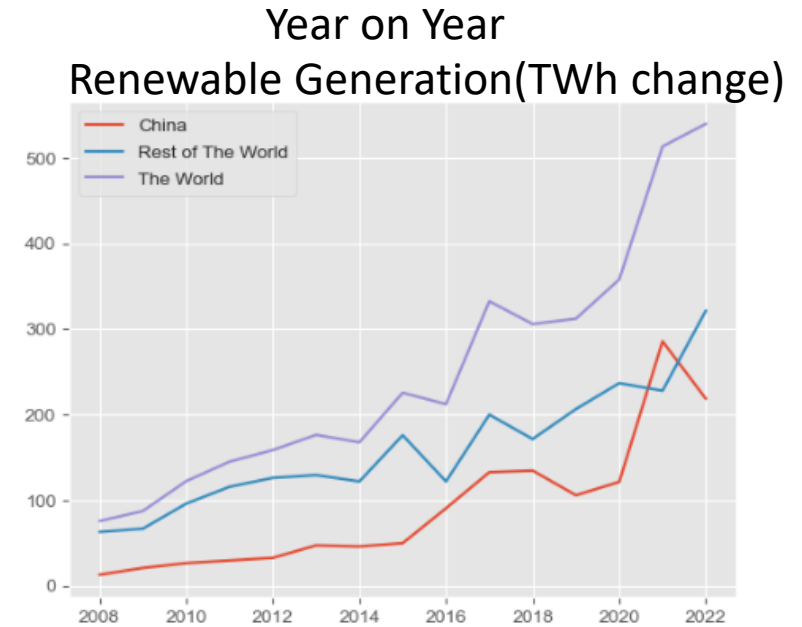
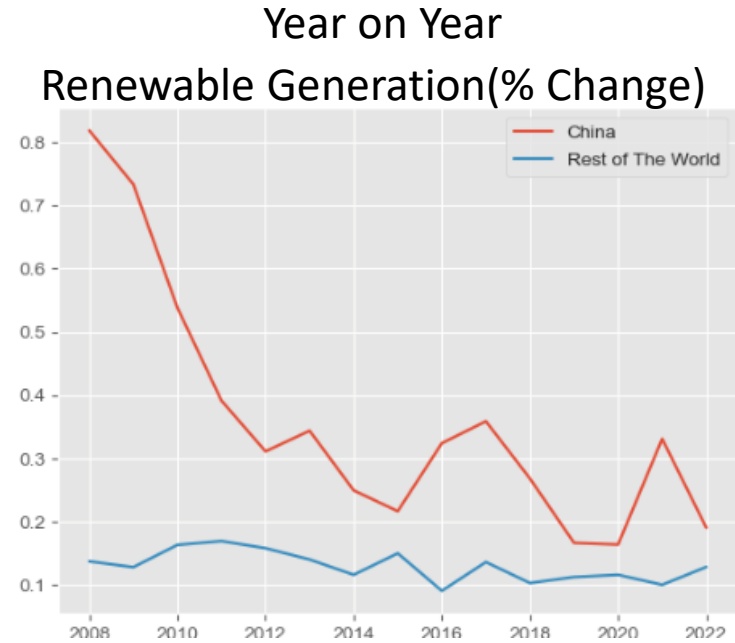
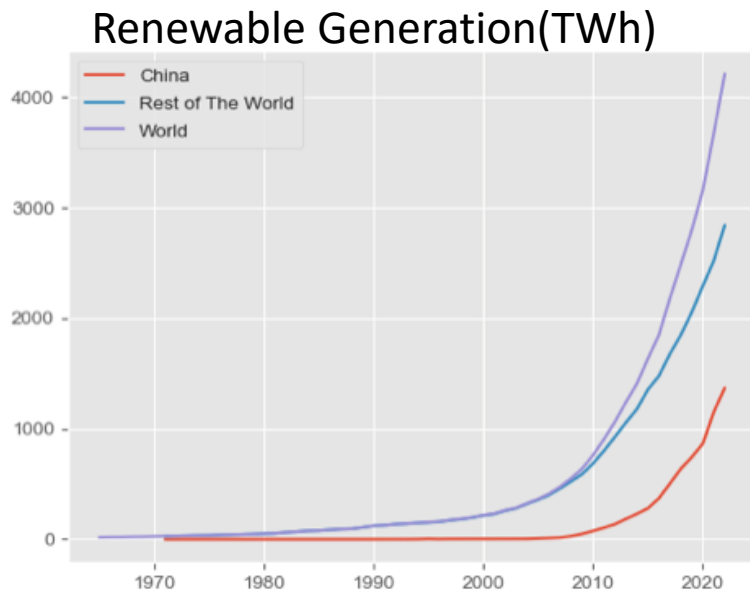


Progress Takes Time

- Tesla Motors – 2003
- Elon Musk’s investment – 2004 – 6.4 million \$
- “Tesla Death Watch” – May 2008
- “Fired 25% of employees” – October 2008
- DOE Loan – 465 million \$ - June 2009
- IPO – 29 June 2010 – 226 million \$
- Model S Fires – 2013 (-20% stock drop)
- Model 3 –March 2016
- “Best selling plug-in passenger car” – 2018
- 2020 – First annual profit



China and the Rest



Population (approx): China 1.4 B , Rest : 6.7 B (x4.5-x5 times)

Wrap up

- Net Zero has a shelf life (If 5 years, new concepts next year - 2026)
- New concepts (near zero, orderly transition etc)
- Investment problems make 1.5 C difficult (1.7 C? , 2 C is possible)
- More energy security problems (**GJ per \$ invested**)
- Progress is in the pipeline but why 15-20 years?
 - Is there a generational “incubation” for new technologies?
- Can China decarbonize the rest of the world?
- Political atmosphere

“Tech is coming, but with China not growing like 2000s, scaling effects may take time.”

In summary – more clean tech in the pipeline

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- 2026 : a new concept (climate secure, orderly transition ?)
- 2028 – new “chemical/material technologies”
- 2030-32 – new mainstream technologies
- Main problem: Demand ?

Questions ?

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