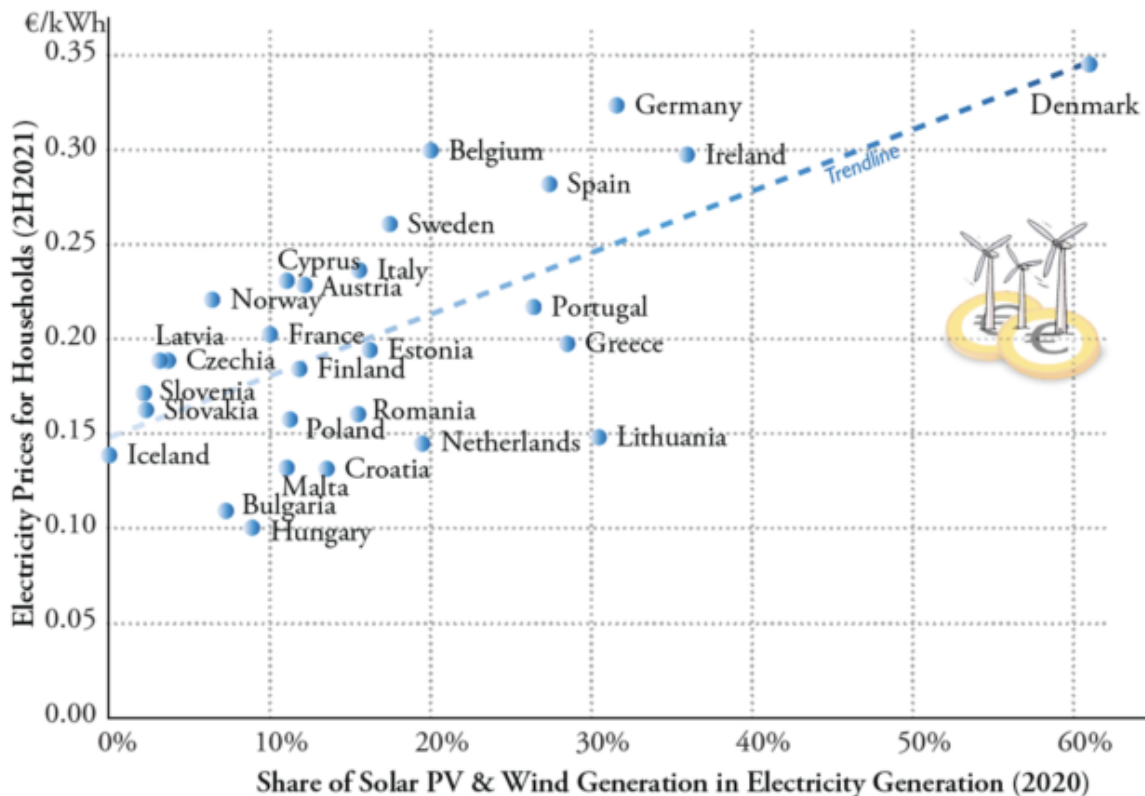


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Figure 46: Solar and Wind Penetration and Electricity Prices in Europe

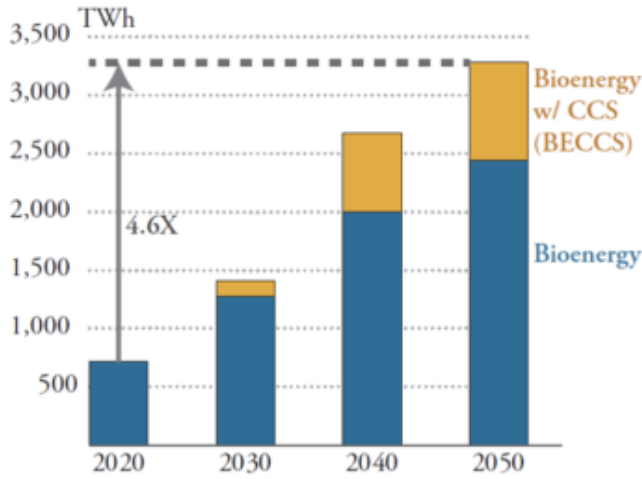


Source: Energy Policy Research, Eurostat, IEA

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IEA NZE??2050??
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Figure 23. Bioenergy for Electricity Generation in NZE



Source: IEA, *Net Zero by 2050* (2021)

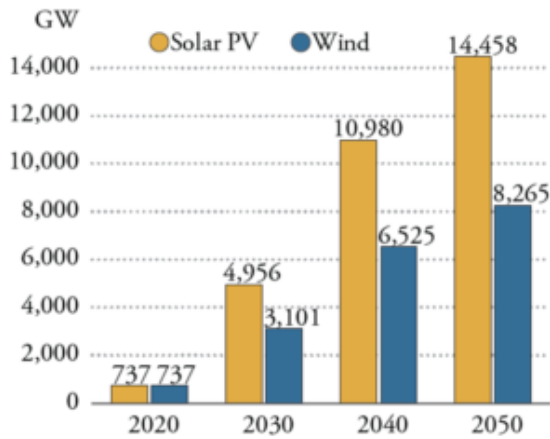
Figure 24. Global Land Requirements for Bioenergy for Electricity Generation in NZE



Source: Energy Policy Research. Land requirement calculations made using FreeingEnergy.

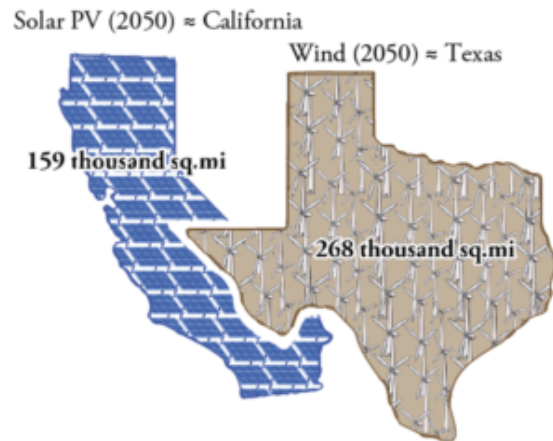
Batt Odgerel, Lucian Pugliaresi, Michael Lynch 38

Figure 25. Global Solar and Wind Capacity in NZE



Source: IEA, *Net Zero by 2050* (2021)

Figure 26. Global Land Requirements for Solar/Wind Farms in NZE



Source: Energy Policy Research based on NZE. Assumes sufficient/optimal grid infrastructure (transmission, storage) and current rate of efficiency

	万 km2	日本=1
メキシコ	197	5.2
フランス	55	1.5
カリフォルニア	42	1.1
テキサス	70	1.8
日本	38	1.0

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?? ? · Monday, July 3rd, 2023



CHUYN/iStock

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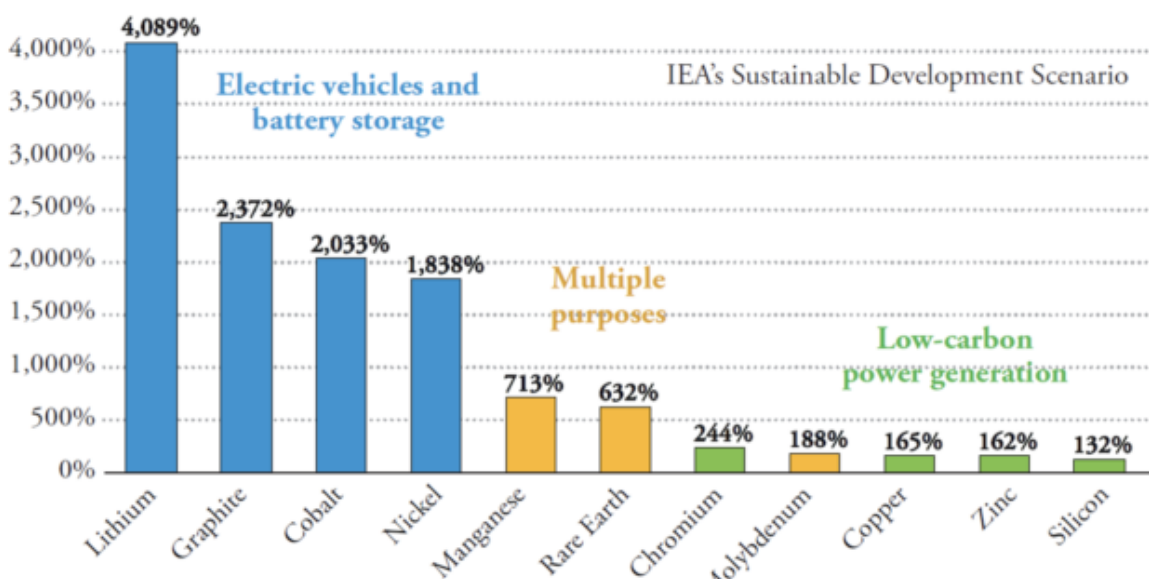
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A Critical Assessment of the IEA’s Net Zero Scenario, ESG, and the Cessation of Investment in New Oil and Gas Fields.

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Figure 33. Required Growth of Critical Mineral Supply (IEA’s SDS scenario, 2020–40)



Source: Energy Policy Research, IEA, *The Role of Critical Minerals in Clean Energy Transitions* (2021)

EV??60kWh????????????????????????????????
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Table 13. Battery Chemistry by Content, Kg (60 kWh Lithium-Ion)

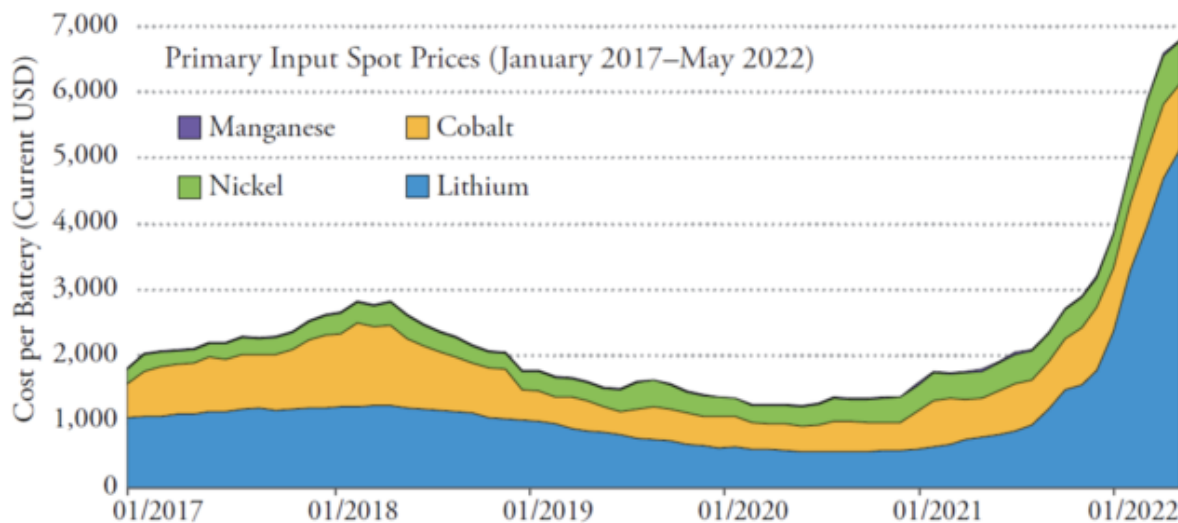
Mineral/Metal	NMC811	NMC523	NMC622	NCA+	LFP
Lithium	5	7	6	6	6
Cobalt	5	11	11	2	0
Nickel	39	28	32	43	0
Manganese	5	16	10	0	0
Graphite	45	53	50	44	66
Aluminum	30	35	33	30	44
Copper	20	20	19	17	26
Steel	20	20	19	17	26
Iron	0	0	0	0	41

NMC811 Nickel (80%) Manganese (10%) Cobalt (10%) **NCA+** Nickel Cobalt Aluminum Oxide
NMC523 Nickel (50%) Manganese (20%) Cobalt (30%)
NMC622 Nickel (60%) Manganese (20%) Cobalt (20%) **LFP** Lithium iron phosphate

Source: Bhutada, G. VC Elements

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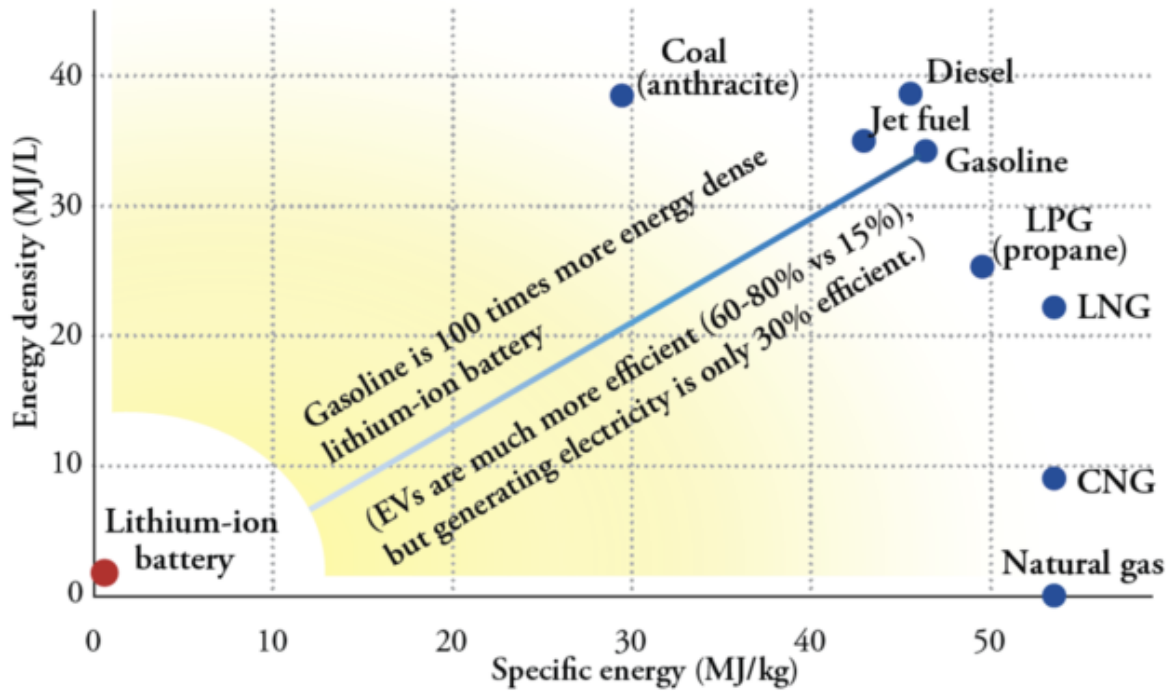
Figure 34. Tesla Battery Cost Based on Monthly Average



Source: Energy Policy Research, LME Monthly Data

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Figure 35. Energy Densities of Common Fuels, Li-ion battery



Source: Energy Policy Research, various sources

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A Mokhtari/iStock

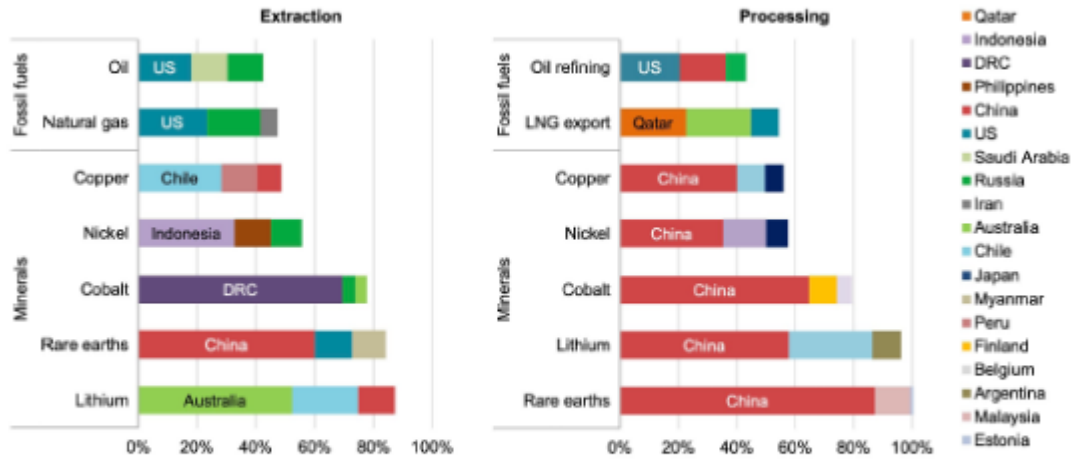
??IEA????????????Net Zero Scenario, NZE????????????

A Critical Assessment of the IEA’s Net Zero Scenario, ESG, and the Cessation of Investment in New Oil and Gas Fields.

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Figure 18. Share of Top Three Producing Countries in Production of Selected Minerals and Fossil Fuels, 2019



Notes: LNG = liquefied natural gas; US = United States. The values for copper processing are for refining operations. Sources: IEA (2020a); USGS (2021), World Bureau of Metal Statistics (2020); Adamas Intelligence (2020).

IEA. All rights reserved.

Source: IEA, *The Role of Critical Minerals in Clean Energy Transitions* (2021)

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IEA????????????????????????????

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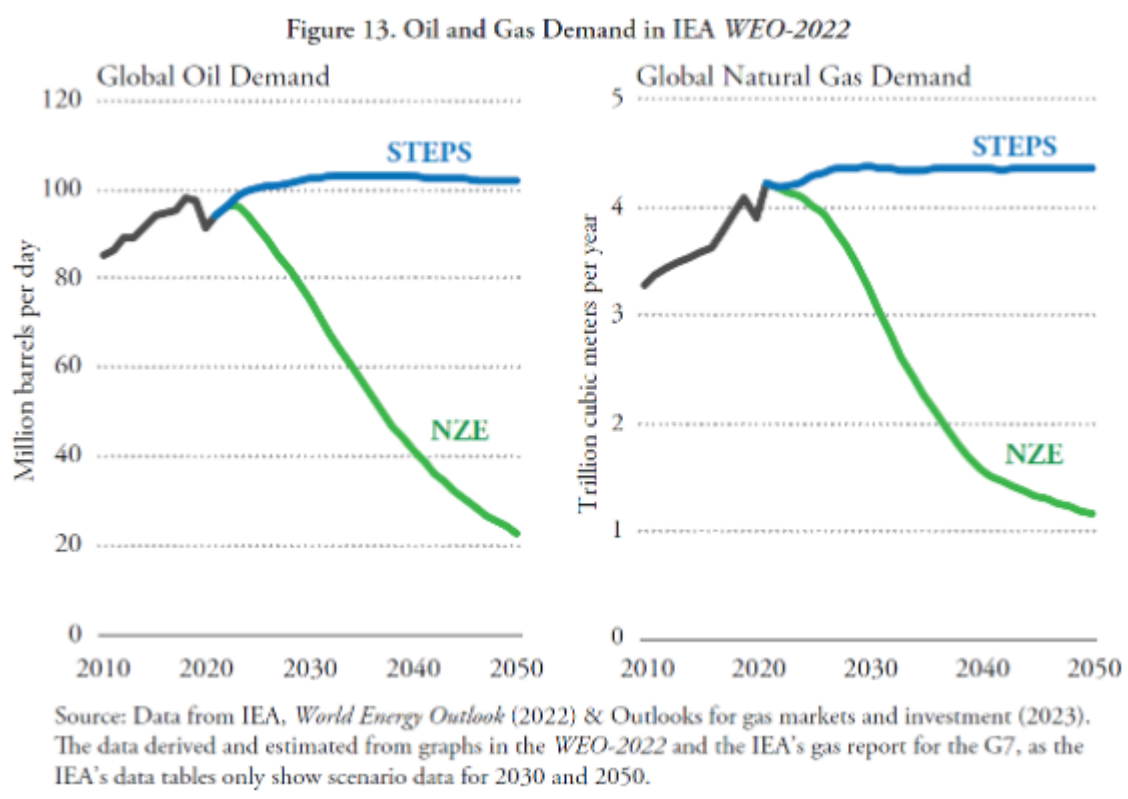
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A Critical Assessment of the IEA’s Net Zero Scenario, ESG, and the Cessation of Investment in New Oil and Gas Fields.

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Rawf8/iStock

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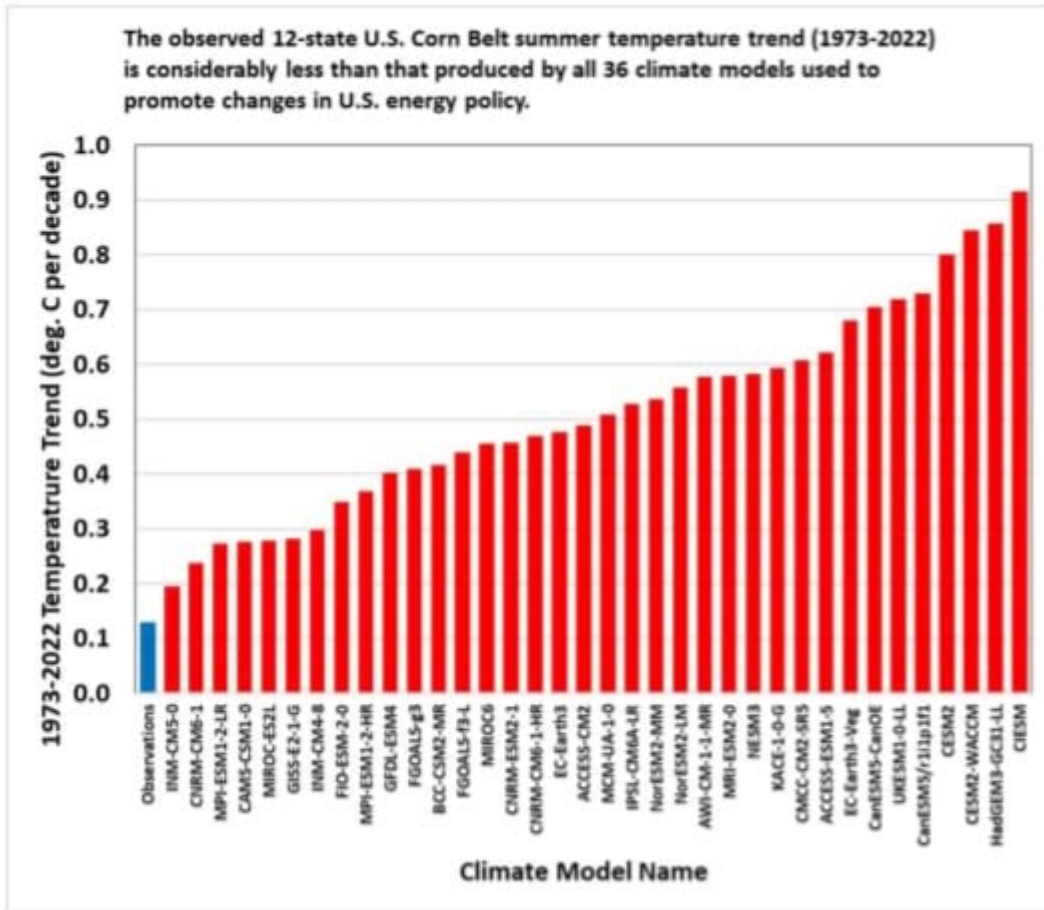
?? ?? · Friday, June 23rd, 2023



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<https://t.co/pF1RfWUM94>
 — BBC News Japan (@bbcnewsjapan) February 18, 2021

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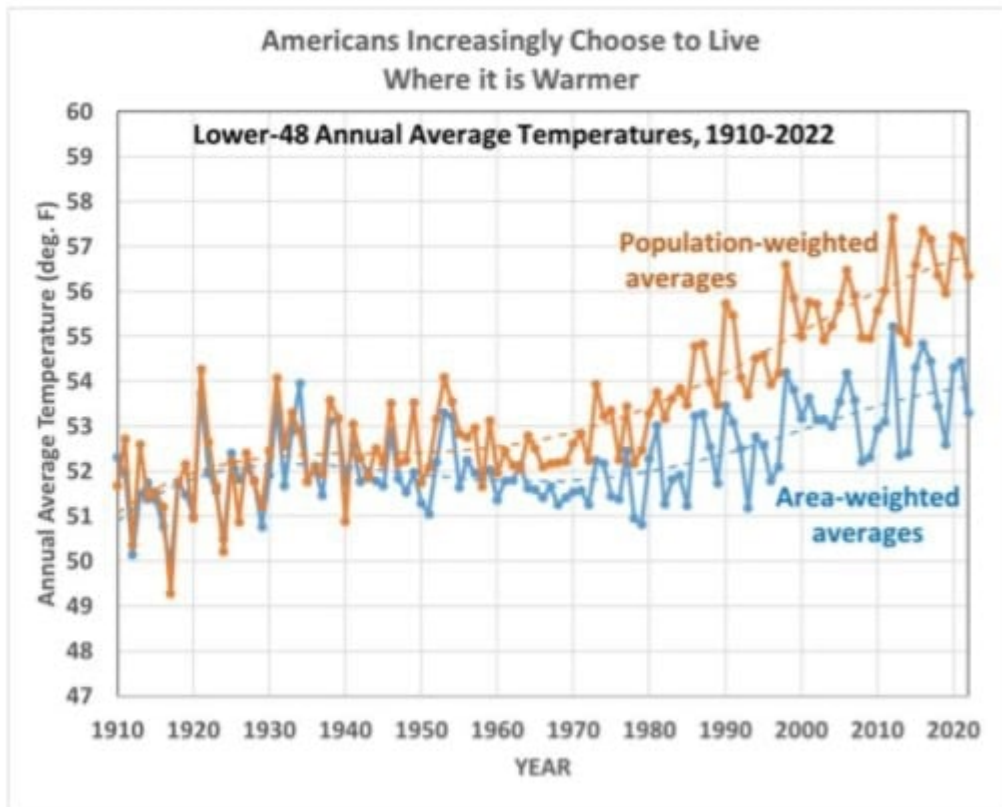
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Darwel/iStock

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?? ? · Monday, May 29th, 2023

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?? ?? · Sunday, May 28th, 2023



sasun bughdaryan/iStock

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?? ?? · Saturday, May 27th, 2023



PhonlamaiPhoto/iStock

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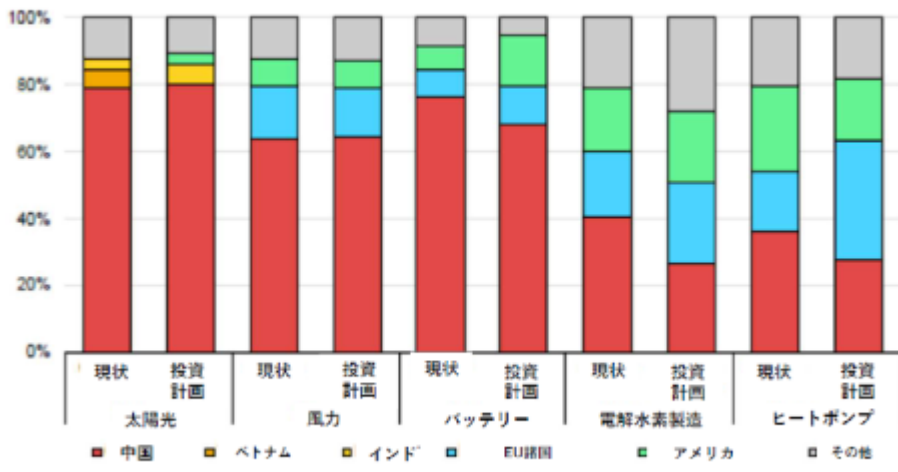
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図3. グリーン技術製造の地域集約度—現状と将来



出典：The State of Clean Energy Technology Manufacturing, IEA, May 2023

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?3?“Securing Clean Energy Technology Supply Chains”, IEA, July 2022 / “The State of Clean Technology Manufacturing”, IEA, May 2023

?4?Reuters, 2011?1?17?

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Posted in ????????????, ??? | [No Comments »](#)

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?? ?? · Wednesday, May 24th, 2023

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???Twitter by True Science PEng, DFP, ADFS, MA, MBA



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Allkindza/iStock

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FACT SHEET: Biden-Harris Administration Proposes New Standards to Protect Public Health that Will Save Consumers Money, and Increase Energy Security

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?? ?? · Tuesday, May 16th, 2023



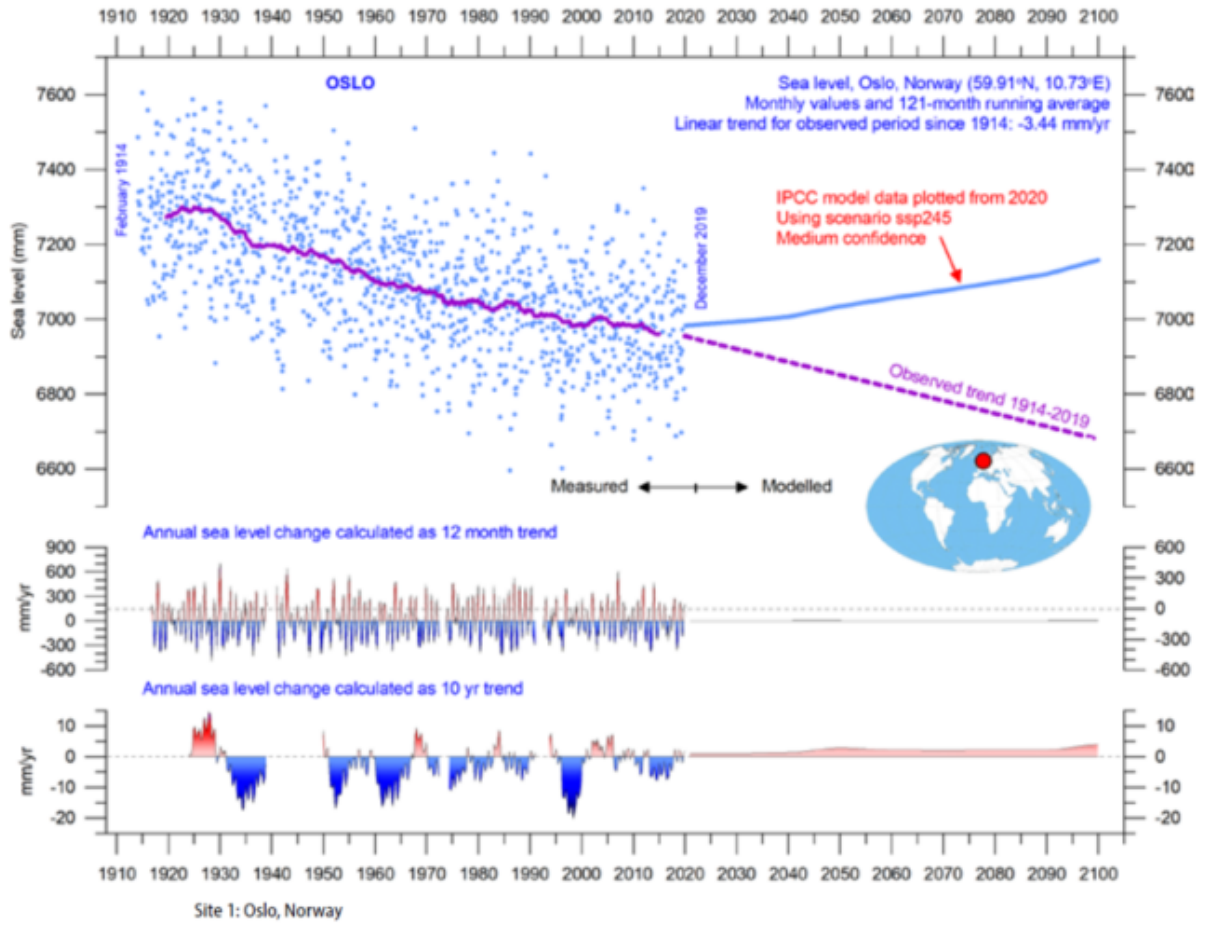
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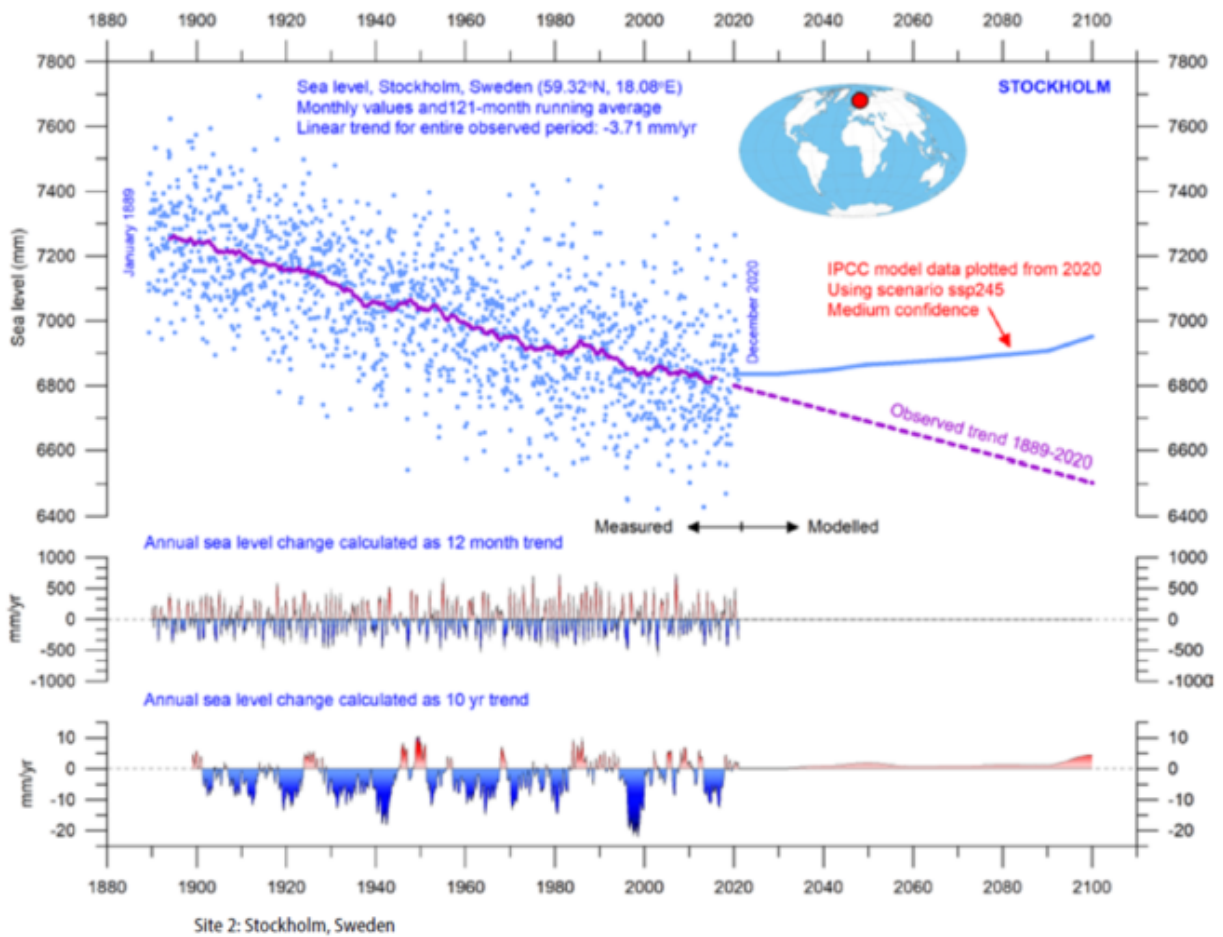
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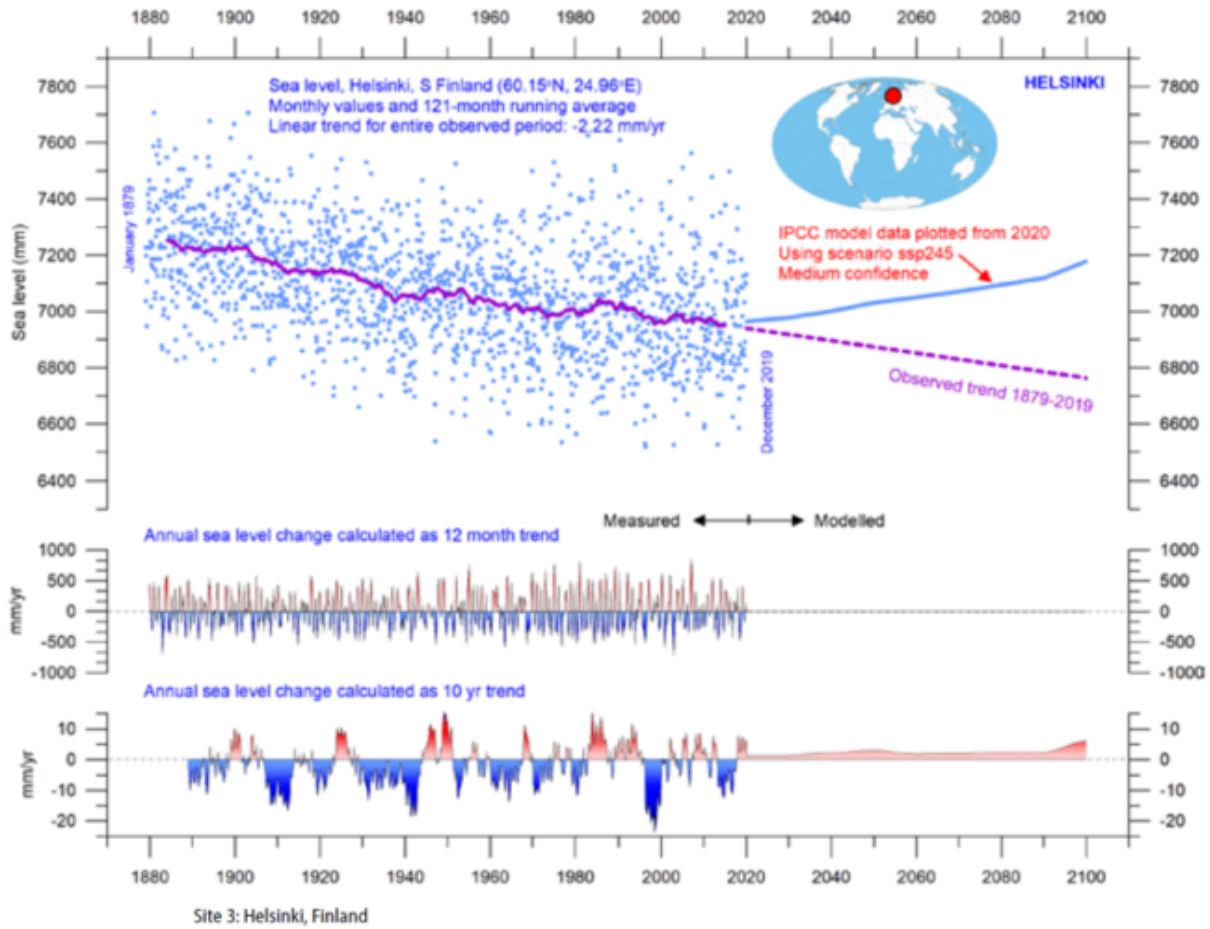
IPCC AR6 Sea Level Projection Tool



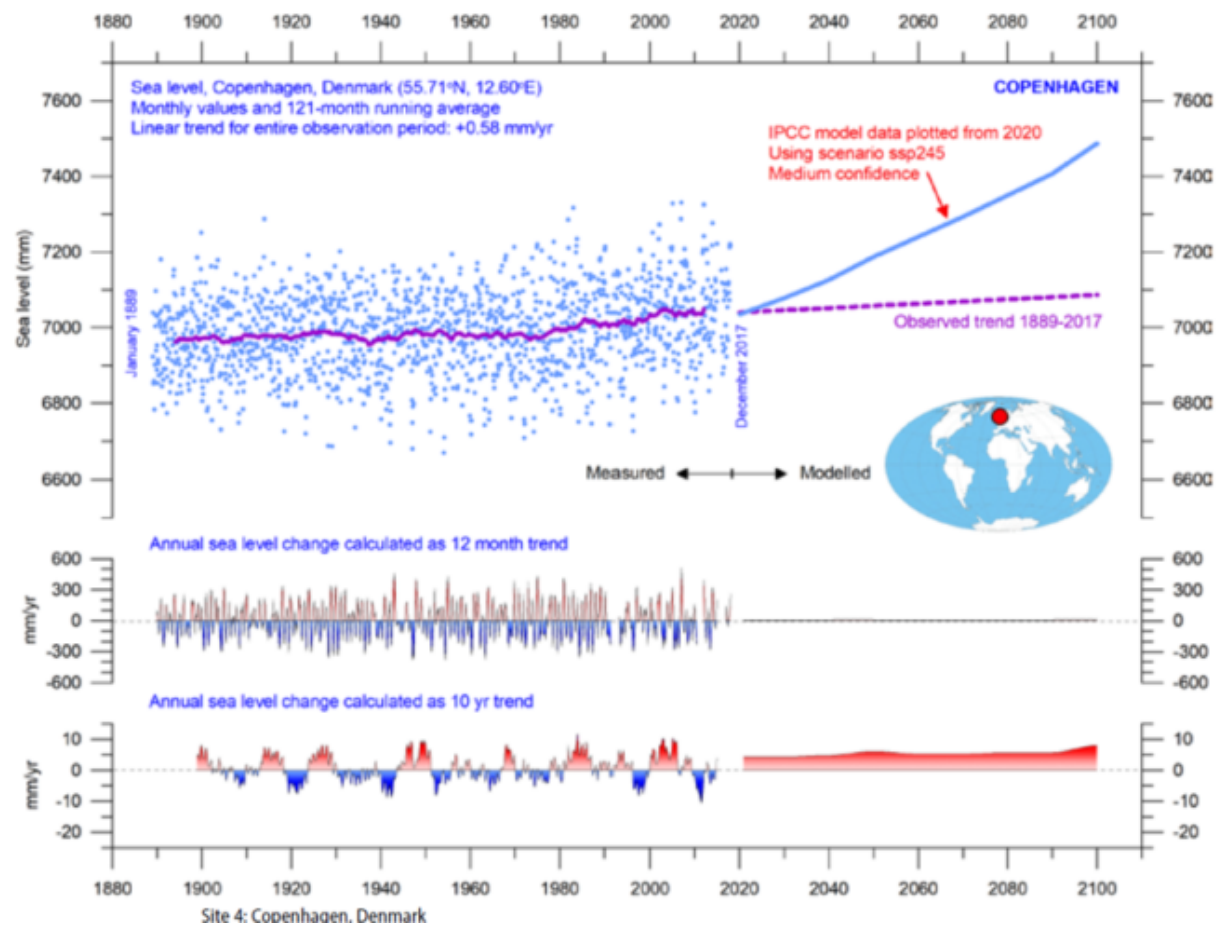
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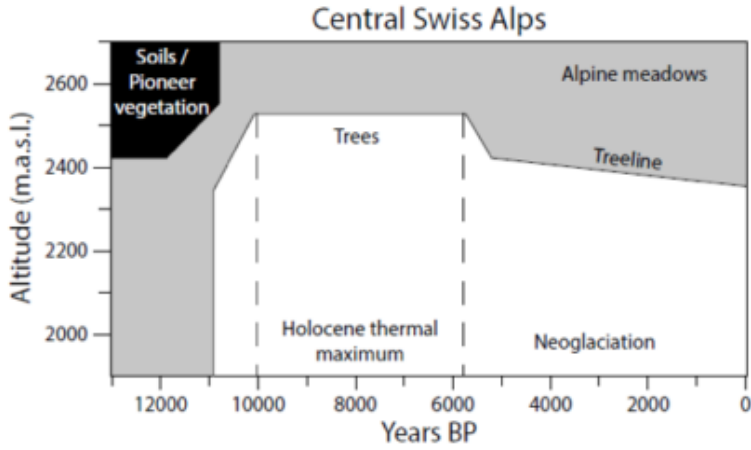


Figure 4: Fluctuations of the treeline in the Swiss Central Alps during the Holocene. The limits of the vegetational zones are placed between the sites according to the presence of the respective vegetation type as inferred by macrofossil analysis. Altitude in meters above sea-level. After Tinner & Theurillat 2003. Current treeline in the Swiss Central Alps is 150-200 m below Holocene Thermal Maximum treeline limit.

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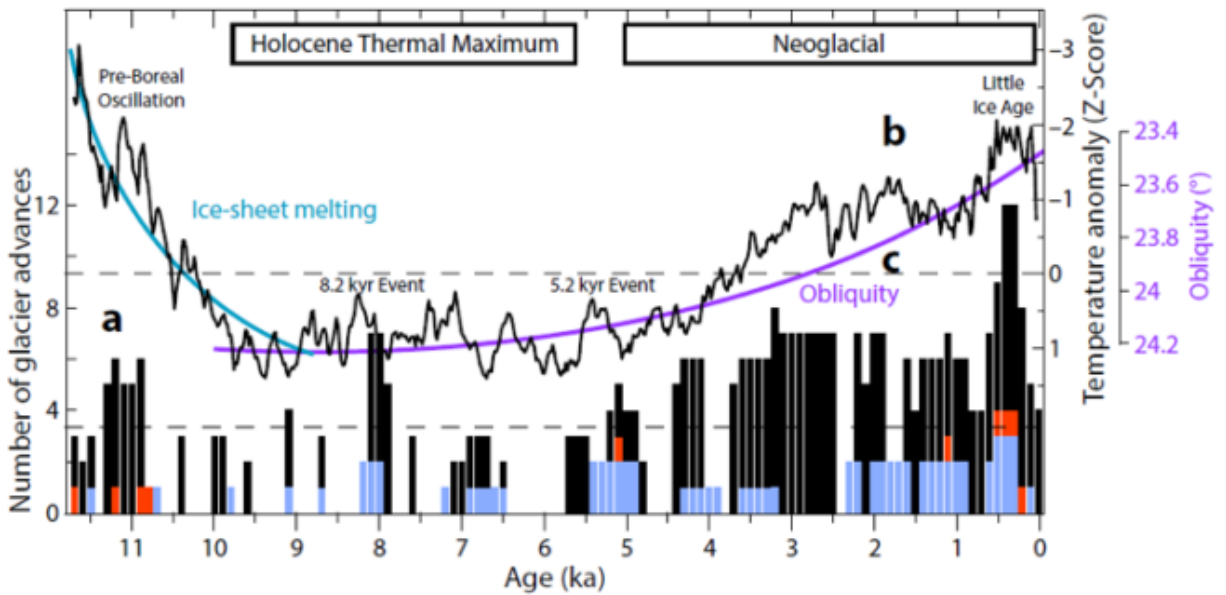


Figure 3: Glacial advances versus temperature (inverted) during the Holocene. a) Number of regions displaying glacier advances at each Holocene century. Black, NH 17 regions; orange, low latitudes single region; ice blue, SH 4 regions. Bottom dashed line, Holocene glacial position average. b) Inverted temperature reconstruction from the same 73 proxies used by Marcott et al. 2013. The reconstruction ends in 1910 and does not include modern warming. Temperature anomaly changes are expressed as Z-score (distance to the mean). Some well-known cooling periods or events are indicated by their accepted names. The period affected by the melting of the extra-Arctic ice sheets is indicated in aquamarine. c) Inverted changes in obliquity. Vinós, 2022, page 55.¹³

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?? ?? · Sunday, May 14th, 2023



borchee/iStock

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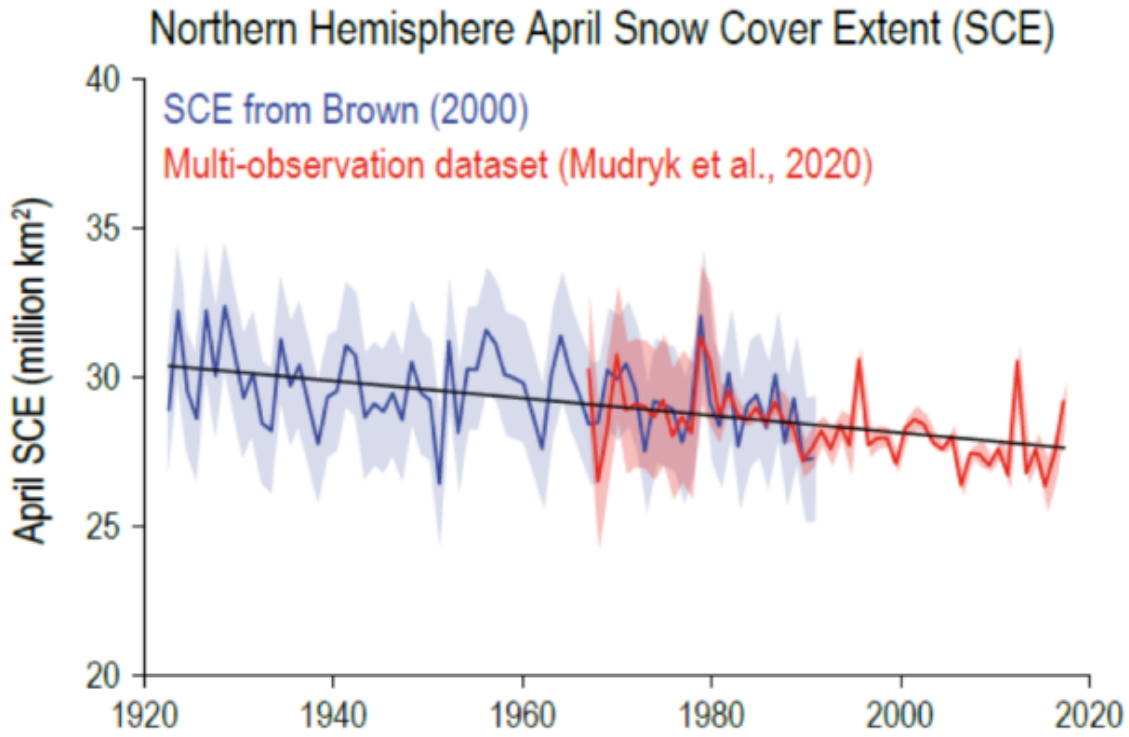


Figure 2: April snow cover extent (SCE) for the Northern Hemisphere. From: AR6, chapter 2.

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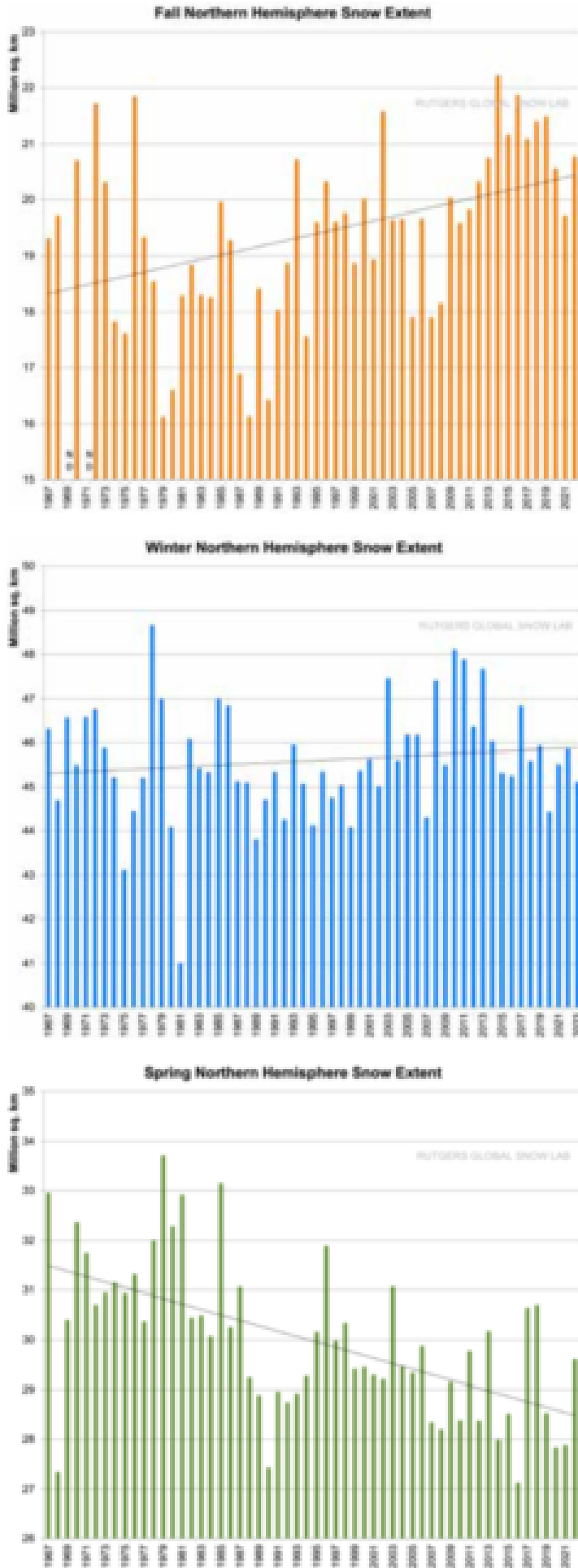


Figure 4: Snow cover extent (SCE) for the Northern Hemisphere for autumn, winter and spring. From: Rutgers Global Snow Lab (2023)

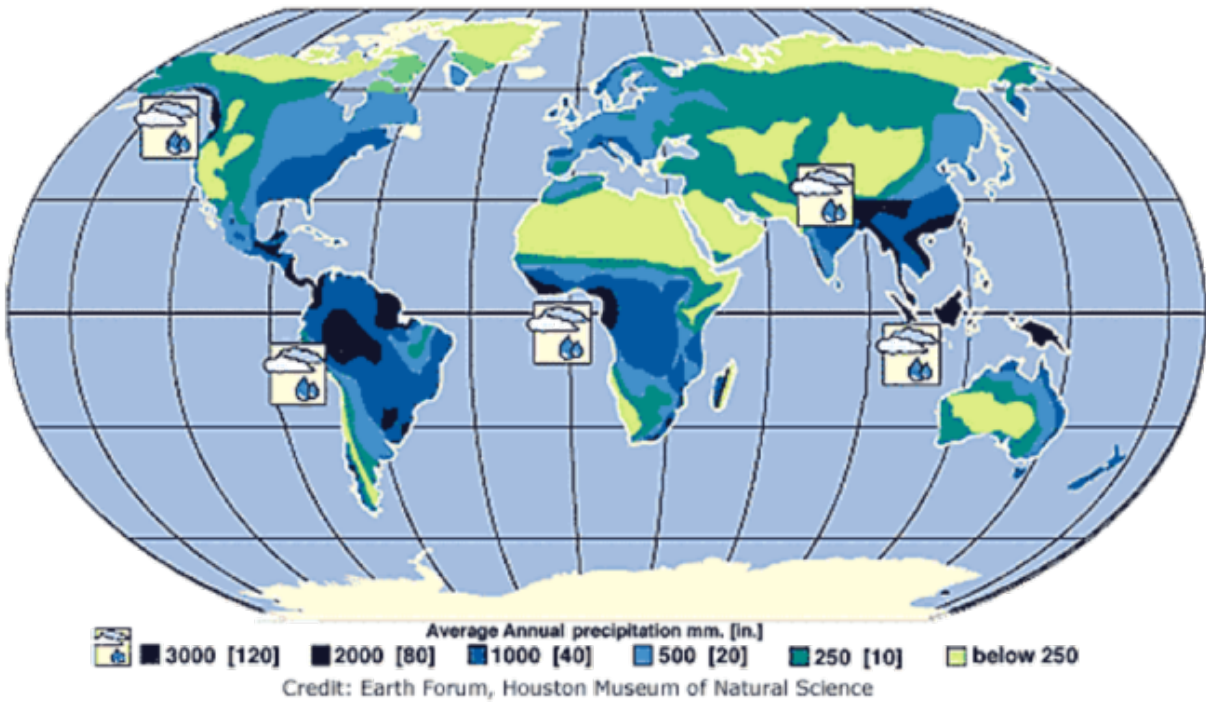
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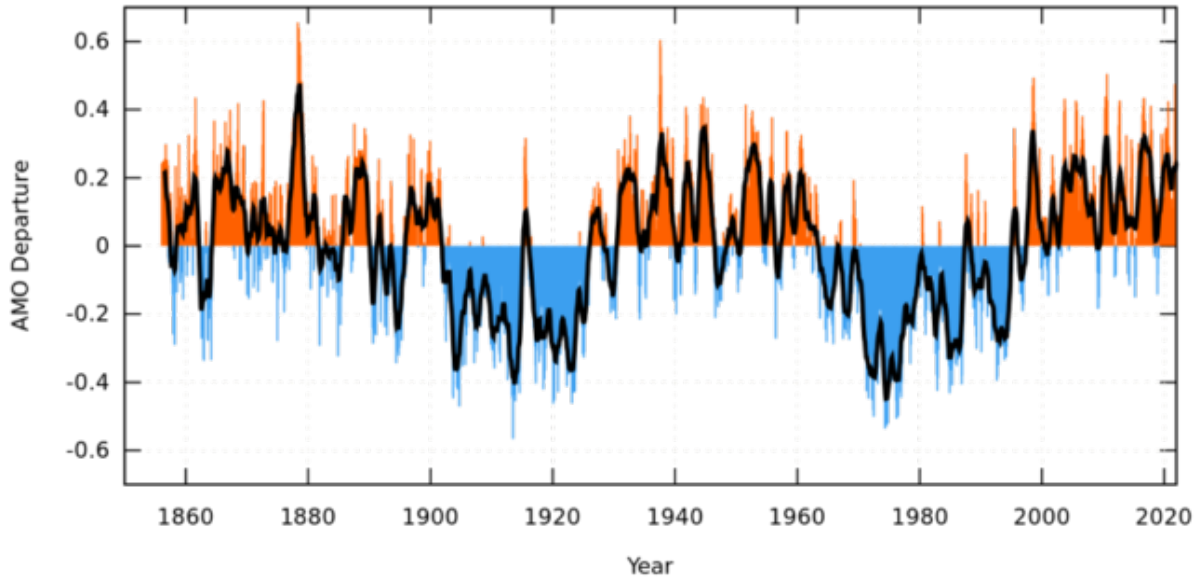
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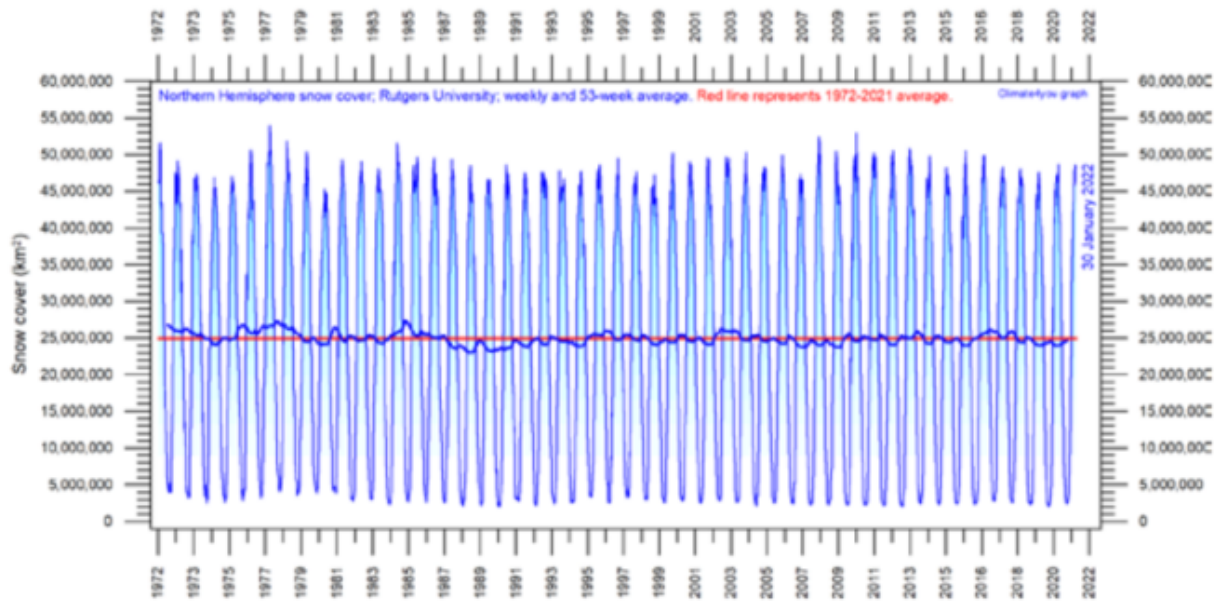


Figure 7: Northern hemisphere weekly snow cover since January 1972 according to the Rutgers University Global Snow Lab (<http://climate.rutgers.edu/snowcover>), the thin blue line is the weekly data, and the thick blue line is the running 53 week average (approximately 1 year). The horizontal red line is the 1972-2021 average. Last week shown: week 1 in 2022. Last figure update: 11 January 2022. Source: Ole Humlum, climate4you.com

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Posted in ???, ????? | No Comments »

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?? ??? ?? · Thursday, May 11th, 2023



mirza kadic/iStock

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RFK Jr.?2024????????????????????
?? ?? · Wednesday, May 10th, 2023



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?? ?? · Saturday, May 6th, 2023



Kanur Ismail/iStock

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CO2

年	日本	米国
1997 年	▲6% (橋本政権)	▲7% (クリントン政権)
2015 年	▲26% (安倍政権)	▲26% (オバマ政権)
2021 年	▲46% (菅政権)	▲50~52% (バイデン政権)

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ESG CO2 CO 2 ESG

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SDGs

Posted in ??????????, ??? | No Comments »

EU?EV????????????????e-fuel????

?? ?? · Sunday, April 30th, 2023



a-image/iStock

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UN Secretary for Global Comms says we “own the science” on “climate change,”
and we think that “the world should know it.”

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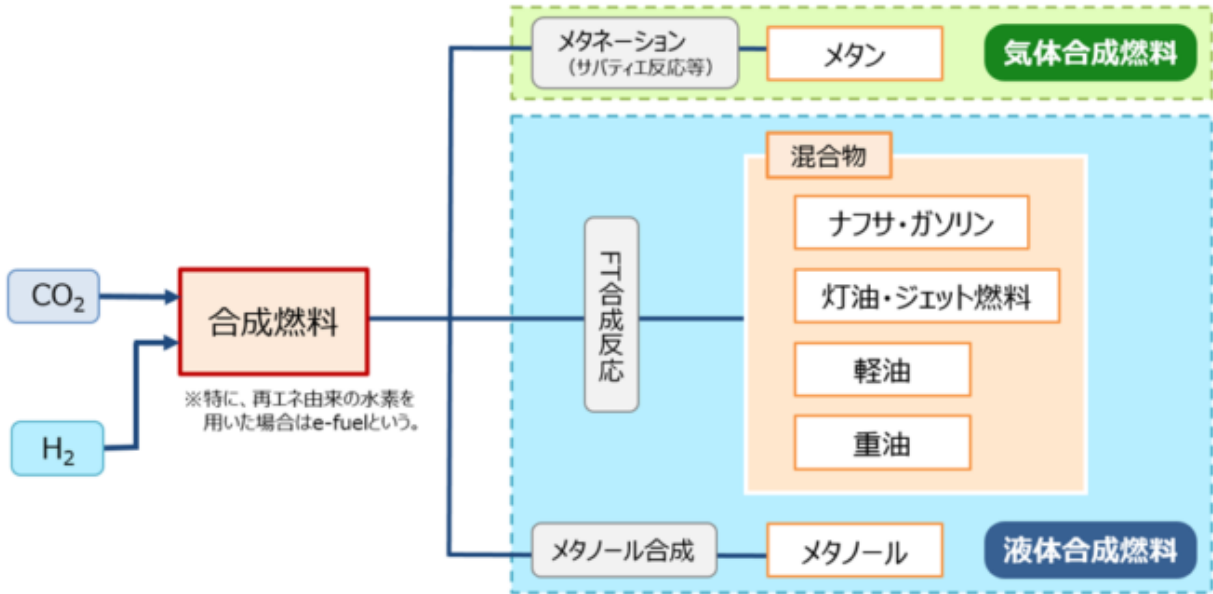
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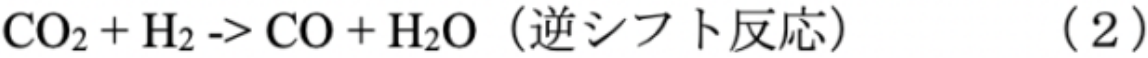
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※NEDO「CO2からの液体燃料製造技術に関する開発シーズ発掘のための調査(2020.8)」の結果に基づき試算。

H ₂	CO ₂	製造コスト	
100円/Nm ³ × 6.34Nm ³ /L	5.91円/kg × 5.47kg/L		
= 634 円/L	+ 32 円/L	+ 33 円/L	= 約700円/L
(32.9円/Nm ³ + 14.65円/Nm ³) × 6.34Nm ³ /L			
= 301 円/L	+ 32 円/L	+ 33 円/L	= 約350円/L
32.9円/Nm ³ × 6.34Nm ³ /L			
= 209 円/L	+ 32 円/L	+ 33 円/L	= 約300円/L
20円/Nm ³ × 6.34Nm ³ /L			
= 127 円/L	+ 32 円/L	+ 33 円/L	= 約200円/L

国内の水素を活用し、国内で合成燃料を製造するケース

海外の水素を国内に輸送し、国内で合成燃料を製造するケース

合成燃料を海外で製造するケース

将来、水素価格が20円/Nm³になったケース

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G7????????????????????

?? ? · Tuesday, April 25th, 2023

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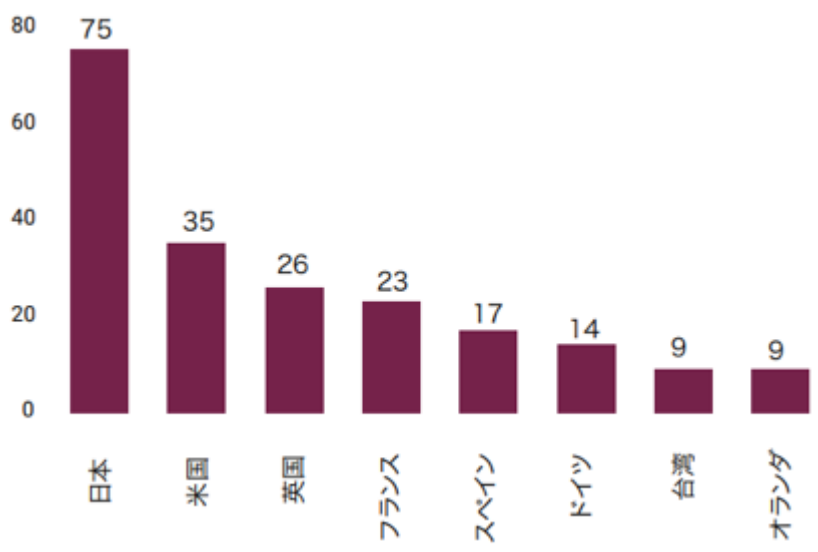
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気候変動 Aリスト 2022

Aリスト国・地域別企業数(上位8か国)



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deepblue4you/iStock

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Hydrogen

Friday, April 14th, 2023



Leestat/iStock

2017-2021, 2021-2025, 2025-2030, 2030-2035, 2035-2040, 2040-2045, 2045-2050, 2050-2055, 2055-2060, 2060-2065, 2065-2070, 2070-2075, 2075-2080, 2080-2085, 2085-2090, 2090-2095, 2095-2100

2017-2021, 2021-2025, 2025-2030, 2030-2035, 2035-2040, 2040-2045, 2045-2050, 2050-2055, 2055-2060, 2060-2065, 2065-2070, 2070-2075, 2075-2080, 2080-2085, 2085-2090, 2090-2095, 2095-2100

2021-2025, 2025-2030, 2030-2035, 2035-2040, 2040-2045, 2045-2050, 2050-2055, 2055-2060, 2060-2065, 2065-2070, 2070-2075, 2075-2080, 2080-2085, 2085-2090, 2090-2095, 2095-2100

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2017-2021, 2021-2025, 2025-2030, 2030-2035, 2035-2040, 2040-2045, 2045-2050, 2050-2055, 2055-2060, 2060-2065, 2065-2070, 2070-2075, 2075-2080, 2080-2085, 2085-2090, 2090-2095, 2095-2100

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?? ?? · Sunday, April 9th, 2023



Hello my names is james,I'm photographer./iStock

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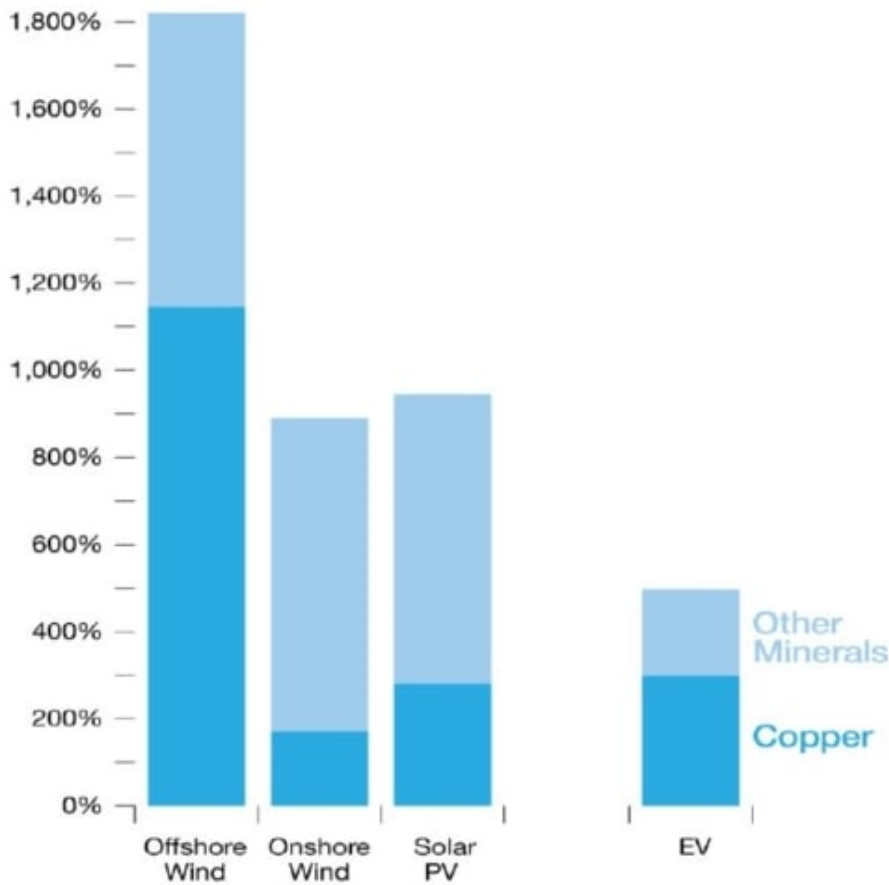
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Mineral Demands for Solar, Wind, and EV to Replace Hydrocarbon Machines

Increased Weight per Watt or per Car



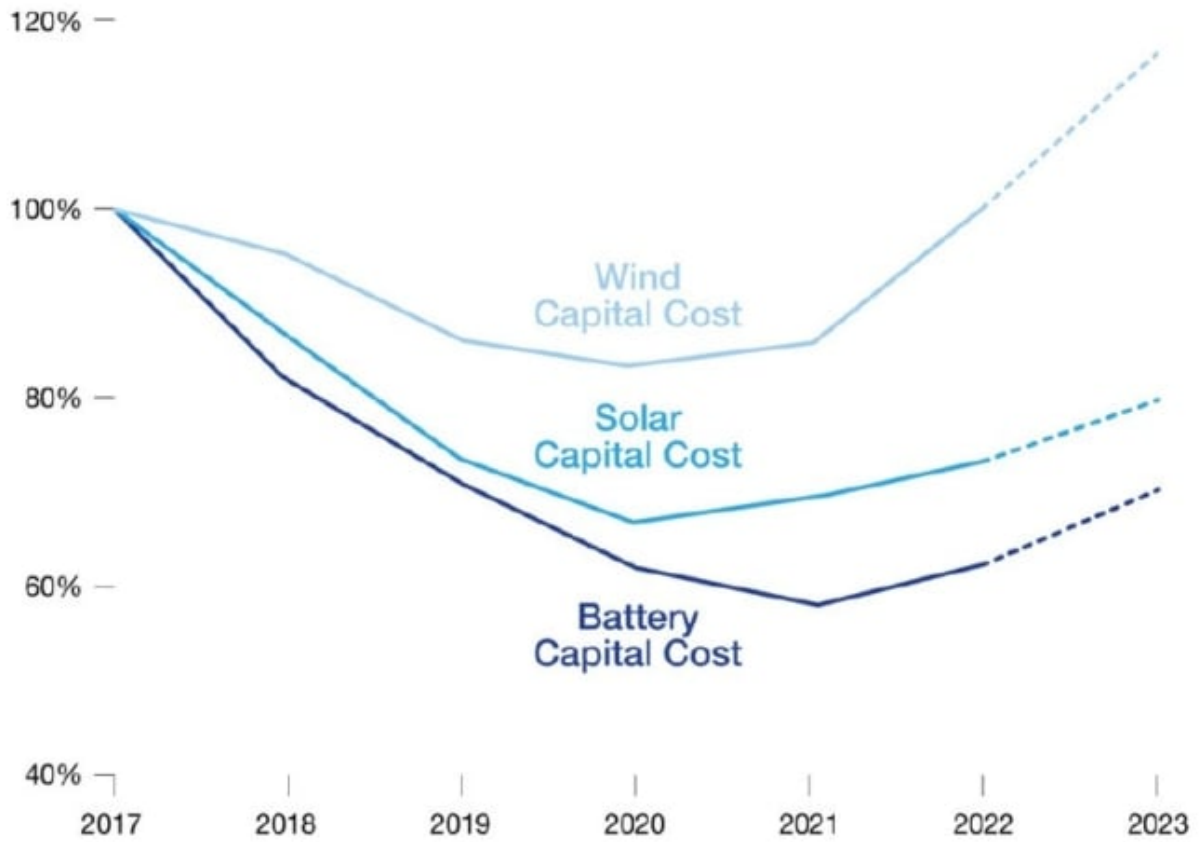
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Costs of Wind, Solar, and Battery Hardware

Change from 2017

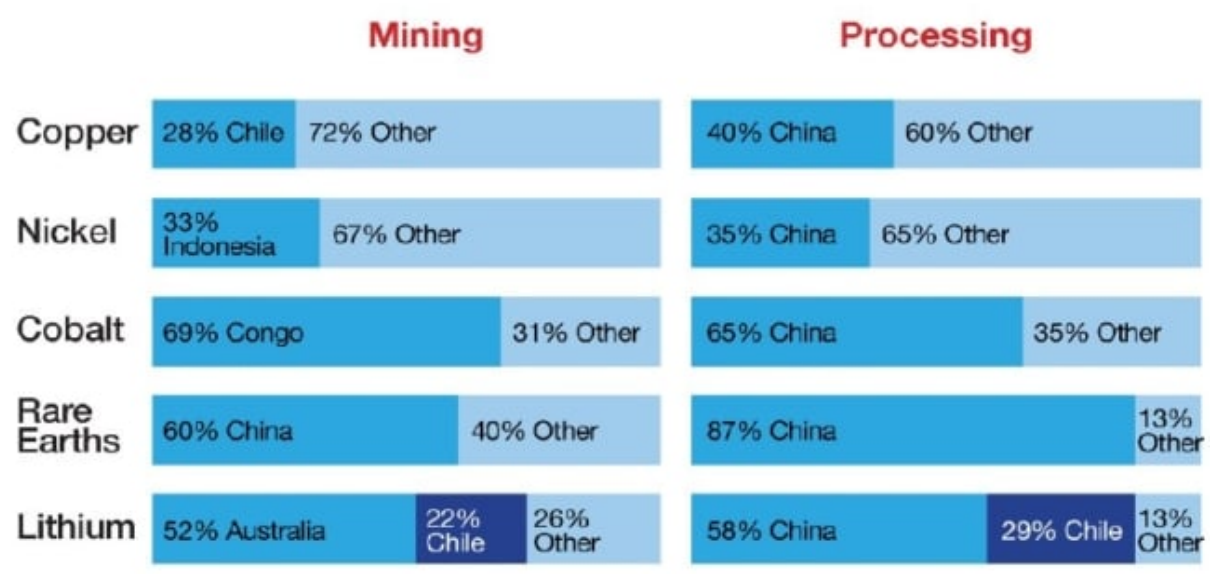


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Sources of Key Energy Transition Minerals



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HiddenCatch/iStock

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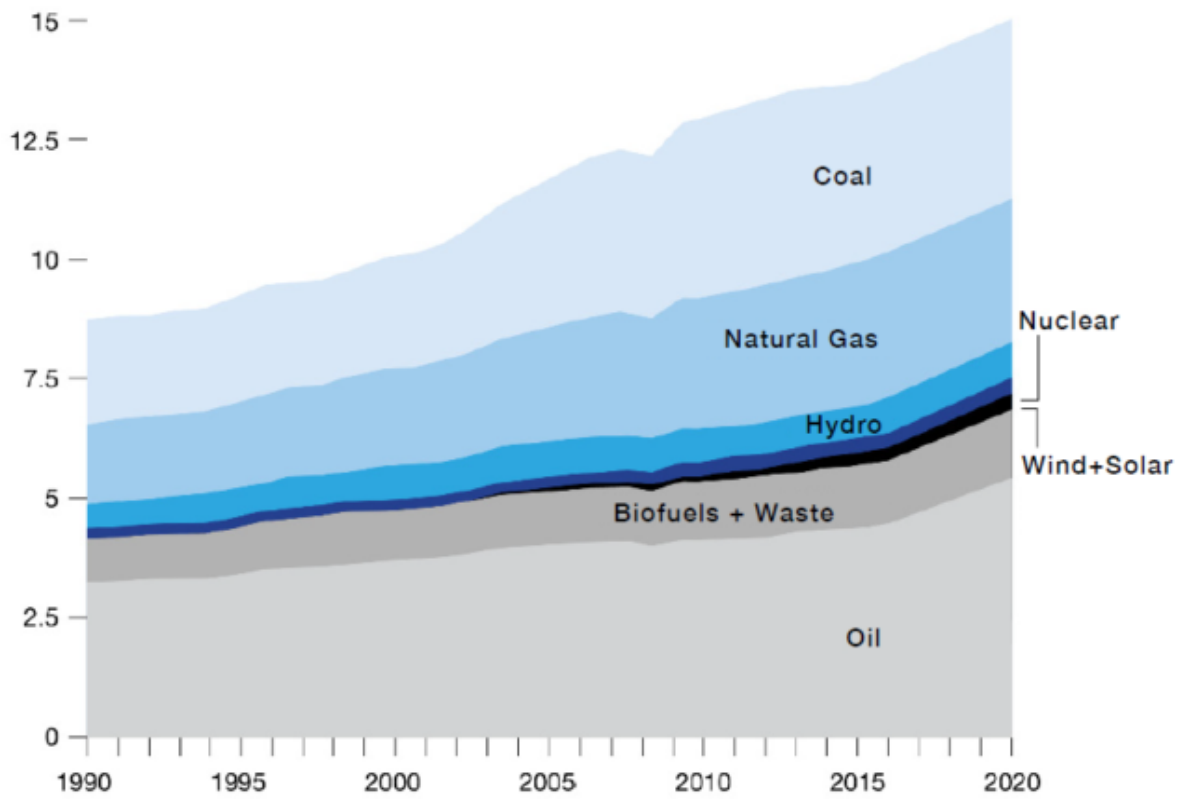
2050??

1. ?????????????????????

??10????????????????????????????????

Growth in Global Energy Supplies

Oil Equivalent (Billion Tons/Year)*



2. ???????????????

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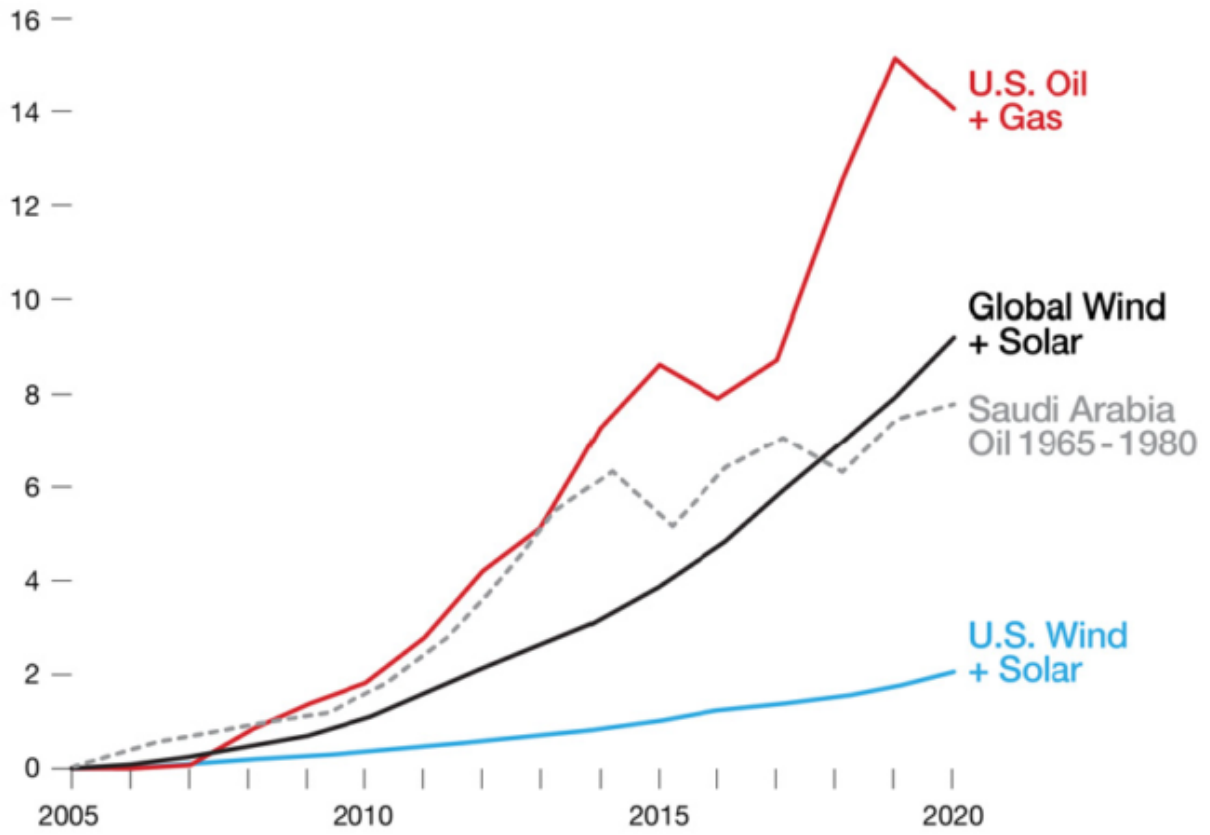
??10???????

??60??????????????5??100????80????????????????????100???

??????????????80????????????????????????????????

Growth of Shale Energy vs. Wind+Solar 2005–20, Compared with Saudi Arabia Oil 1965–80

Increased Production (Million BOE/Day)

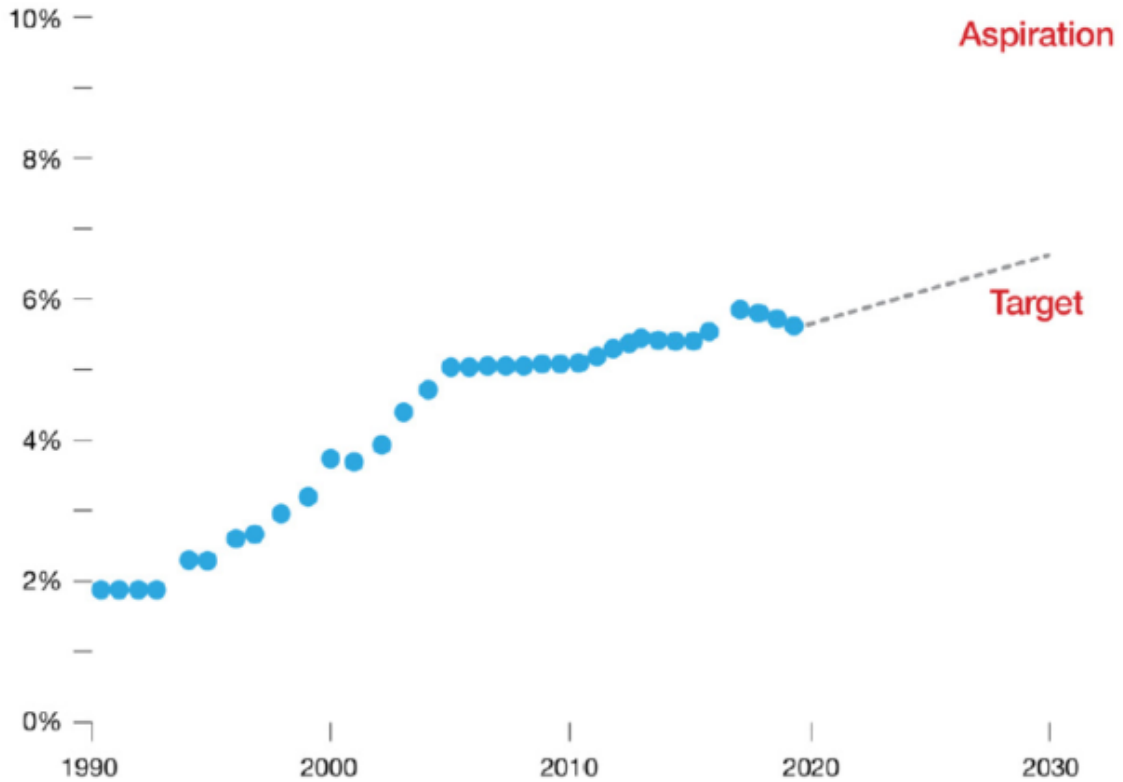


4. ?????????????????????

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Battery Energy Density* (% of Gasoline Density)



*Note: Density comparison incorporates the doubly superior efficiency of a battery+motor vs. gasoline+engine.

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