



Agenda47: President Trump on Making America Energy Independent Again

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

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?? ?? · Thursday, February 8th, 2024

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

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?? ?? · Wednesday, February 7th, 2024

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Unleash Energy Dominance



Under President Donald J. Trump's leadership, the United States became the number one producer of oil and natural gas on earth, achieving American energy independence and delivering historically low costs for oil, gas, diesel, and electricity to consumers and businesses. President Trump unlocked our country's God-given abundance of oil, natural gas, and clean coal. He approved the Keystone XL and Dakota Access, pipelines, opening federal lands and offshore areas for responsible oil and gas production, and ending the unfair and costly Paris Climate Accord. Joe Biden reversed the Trump Energy Revolution and is now enriching foreign adversaries abroad. President Trump will unleash the production of domestic energy resources, reduce the soaring price of gasoline, diesel and natural gas, promote energy security for our friends around the world, eliminate the socialist Green New Deal and ensure the United States is never again at the mercy of a foreign supplier of energy.



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

CO2??

?? ?? · Tuesday, February 6th, 2024



baileystock/iStock

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?????????Voters???1????????????????????3??

???1????????????????????15????????????????????1?????????1????????????????

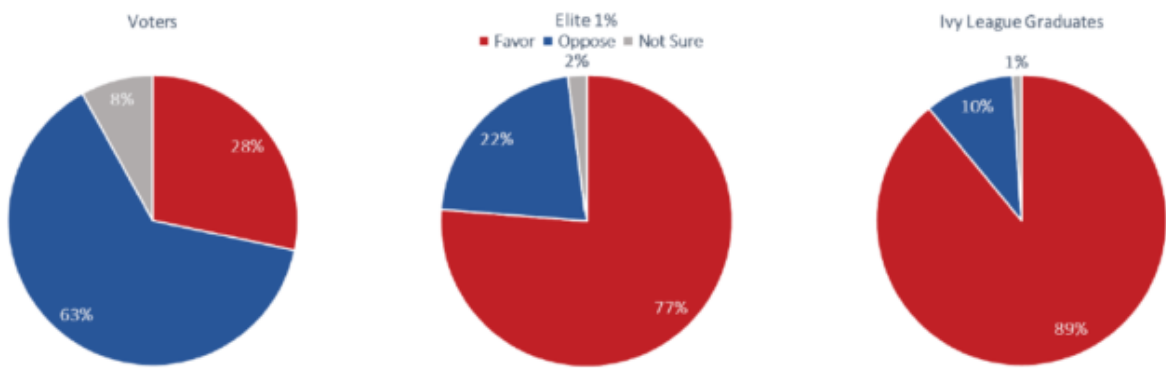
????????????????1??

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1.??

?????63%?????????????????77?????????????????89%???

To fight climate change, would you favor or oppose the strict rationing of gas, meat, and electricity?



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

?????72??100?????????????70??500?????

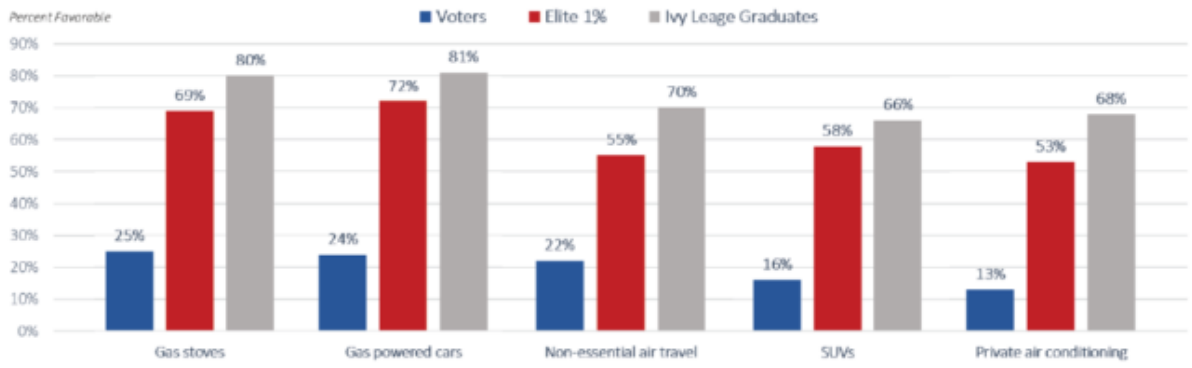
How much would you personally be willing to pay each year in terms of taxes and higher costs to reduce climate change?



3.????????????????????????????

????????????????????SUV????????????????????????????????13??25????????????????53??
72????????????????????????????66??81????????????????

To fight climate change, would you favor banning each of the following?



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????44???

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??CO2??
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Posted in ???, ????? | No Comments »

CO2??

?? ?? · Monday, February 5th, 2024



Sakorn Sukkasemsakorn/iStock

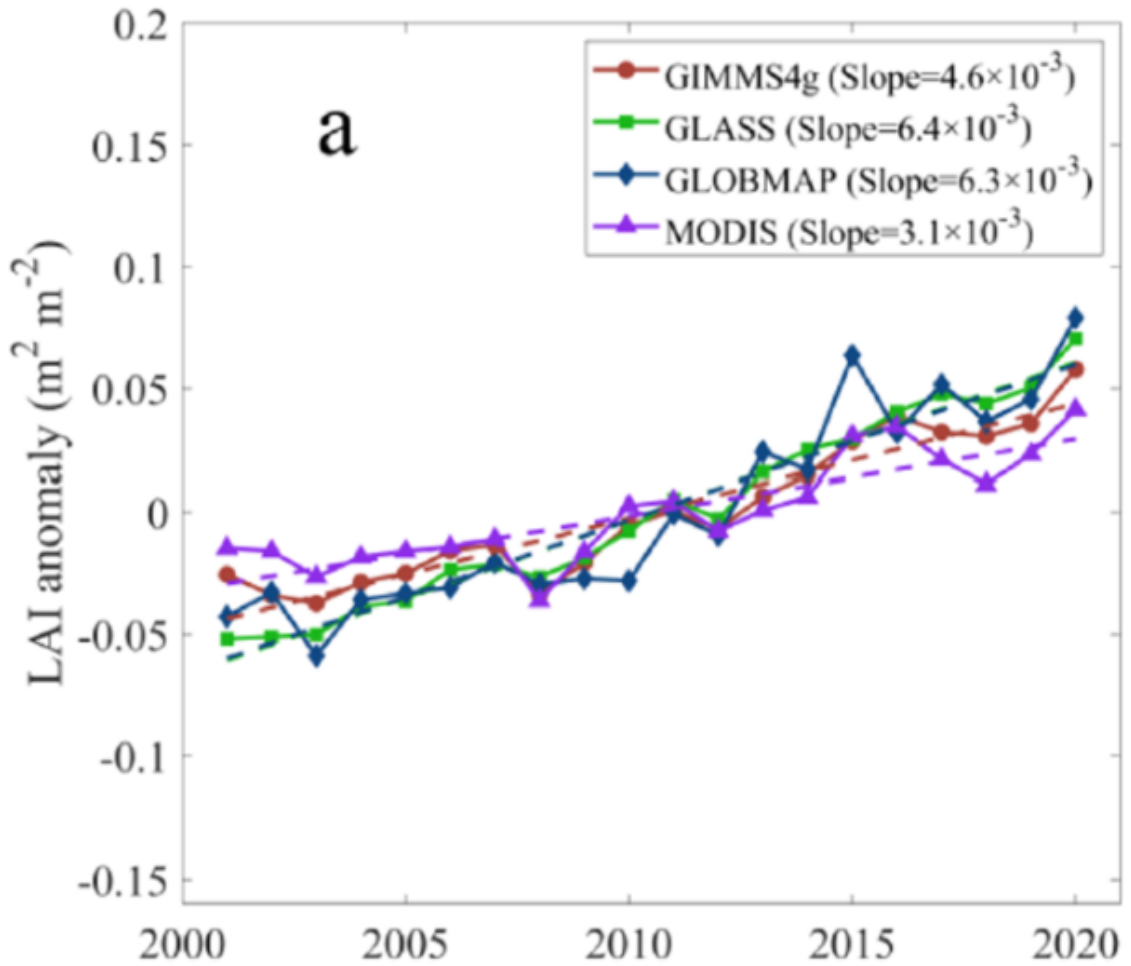
CO2???global
 greening)??

???2000??2020?????????????????Leaf Area Index, LAI??????

LAI??????1??3????1??????????1????????????????????
 ??1??

????????LAI?20??0.1????????????????????1??????????????????0.1????????????????????????????????

4??



?1?LAI???

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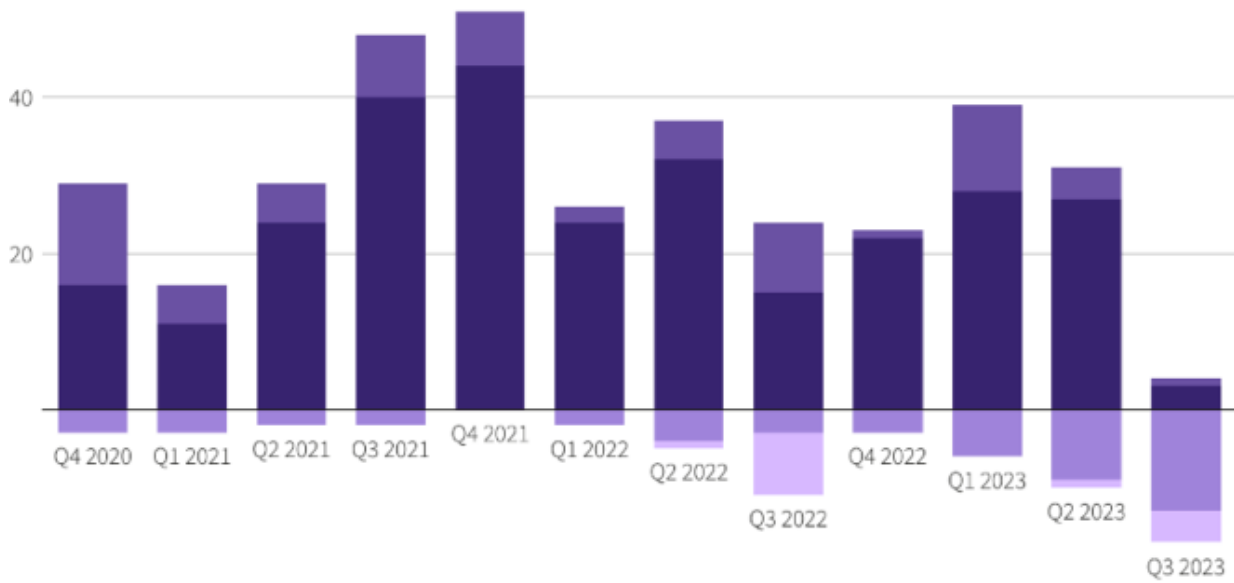
CO2?????Srad?????P???????Soil Moisture, SM?????Airt??5??????????????2??

????CO2????????????????

Sustainable fund launches plummet

Asset managers closed sustainable funds faster than they opened new ones in the third quarter

● Launches ● Funds moved into sustainable category ● Closures ● Funds dropping sustainability mandates



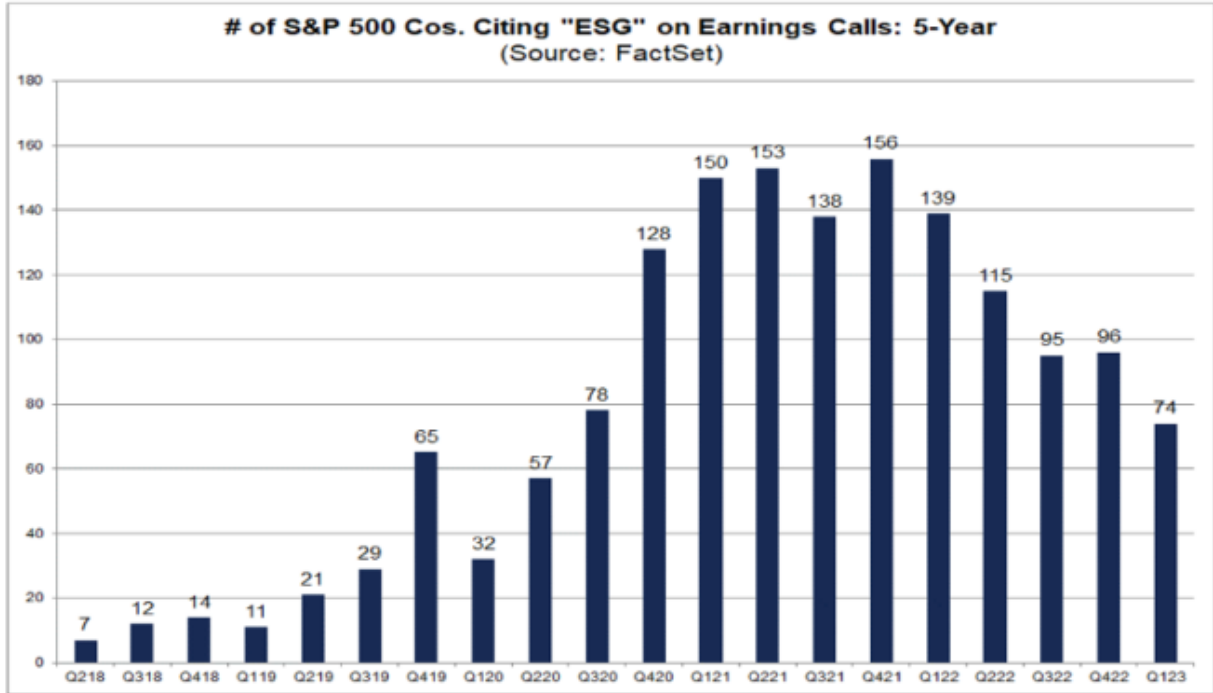
Source: Morningstar Manager Research

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??????ESG??????S&P500??????2020??2???????



??????ESG????????????????74??????S&P500????????????????ESG????????????2020
 ??2????57????????????????2021??4????156????????????????ESG??????S&P500?????5?
 ?????4????????????????2022??4????????????2023??1????????????ESG?????S&P50
 0????23%?????



FACTSET

2018-2023

Q218-Q123

ESG



ESG
ESG
ESG
“ ”
“ ”



ESG
ESG

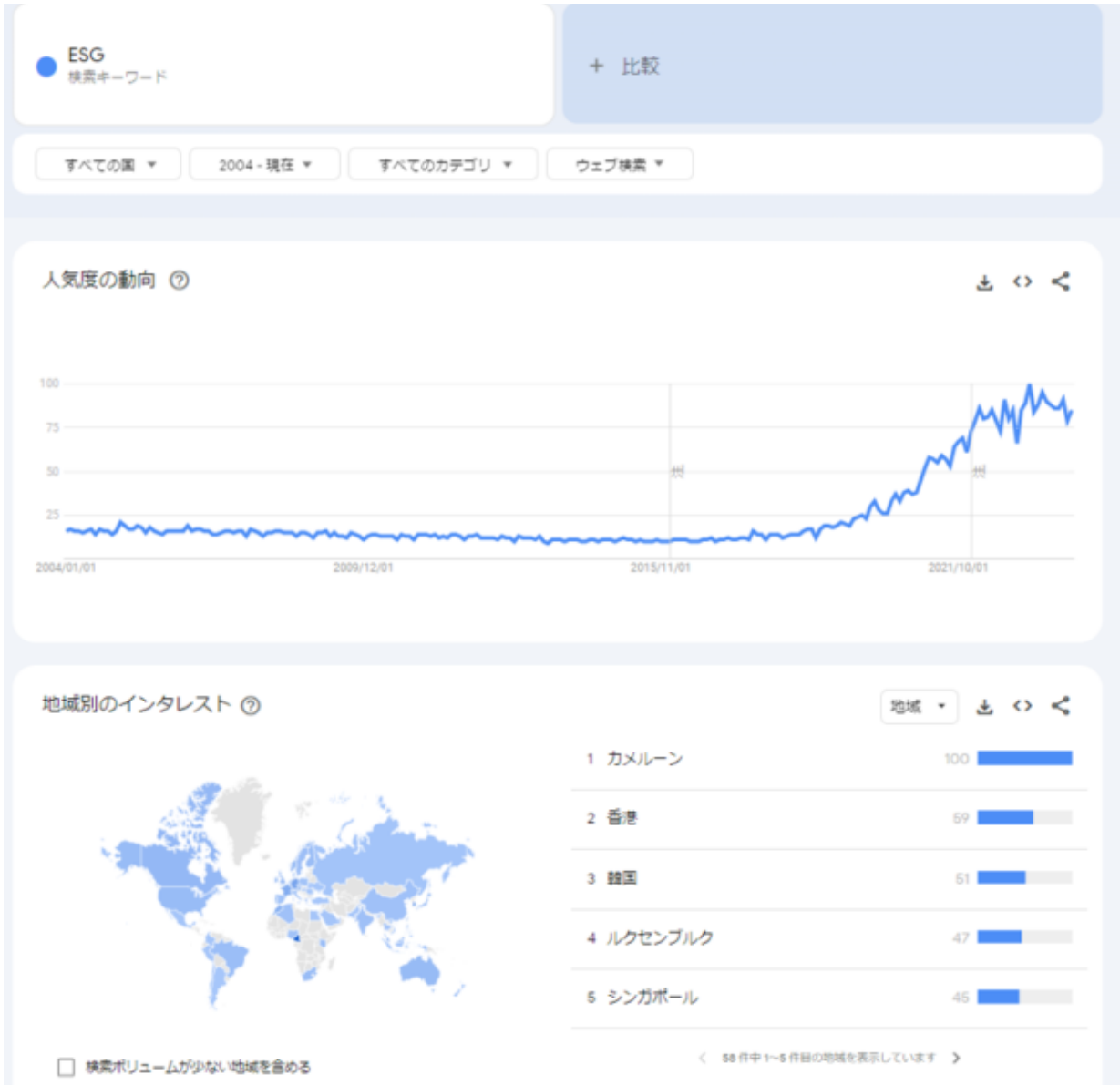


ESG
ESG
ESG
ESG

ESG
DWS
ESG

ESG





???Google???

????????????????????ESG????????????????????

2023??ESG??????????

ESG??ESG??ES
G??ESG????????????????????????

ESG????CO2??
????CO2??
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EV?HV?PHV?
transitional

“transitional fuel?” COP

“transition away from fossil fuels”

“transition away from fossil fuels” COP

COP 2022 COP 2023

COP 127 COP 119 COP UAE

COP

COP28

CCUS? COP

COP COP28

125 CO2

CO2

CO2

de-industrialization

de-industrialization

EU de-industrialization

de-industrialization

????????????10?11????????????5.4%?5.8%????¹¹????????????

????????????0.3%????????
?????G7????????

????????11????????600????????

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????????IT????????EU????

????????EU????EU????

????????EU????EU-
CBAM????CBAM????

?CBAM????EU????EU????

????EU -
ETS????3????2013????EU????1500????EU????100
0????EU????1.5????2500????1500????10
00????17????

????EU????ETS????ETS????ETS????
?FIT????EU????EU????

????EU????CBAM?EU??

???EU???????

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EU CO2 EU
EU
EU

COP28

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EurActiv, January 16, 2024

Posted in | No Comments »

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?? ?? ? - Thursday, February 1st, 2024



ollo/iStock

10 CA?

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????????GDL????????

????????????????????????????????????GDL????????????33?4000????????????
??100????????GDL????????????4????????????????????????????????????
????????????????????????????????15?GDL????????

GDL????????????555????????????25????????????????????3000????????????
????????38????35????????

??12?7?8?GDL??

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????8????????????????????1????????????????????????????????????
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??6??1????2500?3000????????
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??6??10????????????EU????????????6????????
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DGL?4??
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- ???2????????1????????????????????
- ?????????????????????1?2????600?????
- 2????????????????????1000? ?????????????

1????????600??0.47????????????????????
????????871????600????“?”????????????????????846????????????????????

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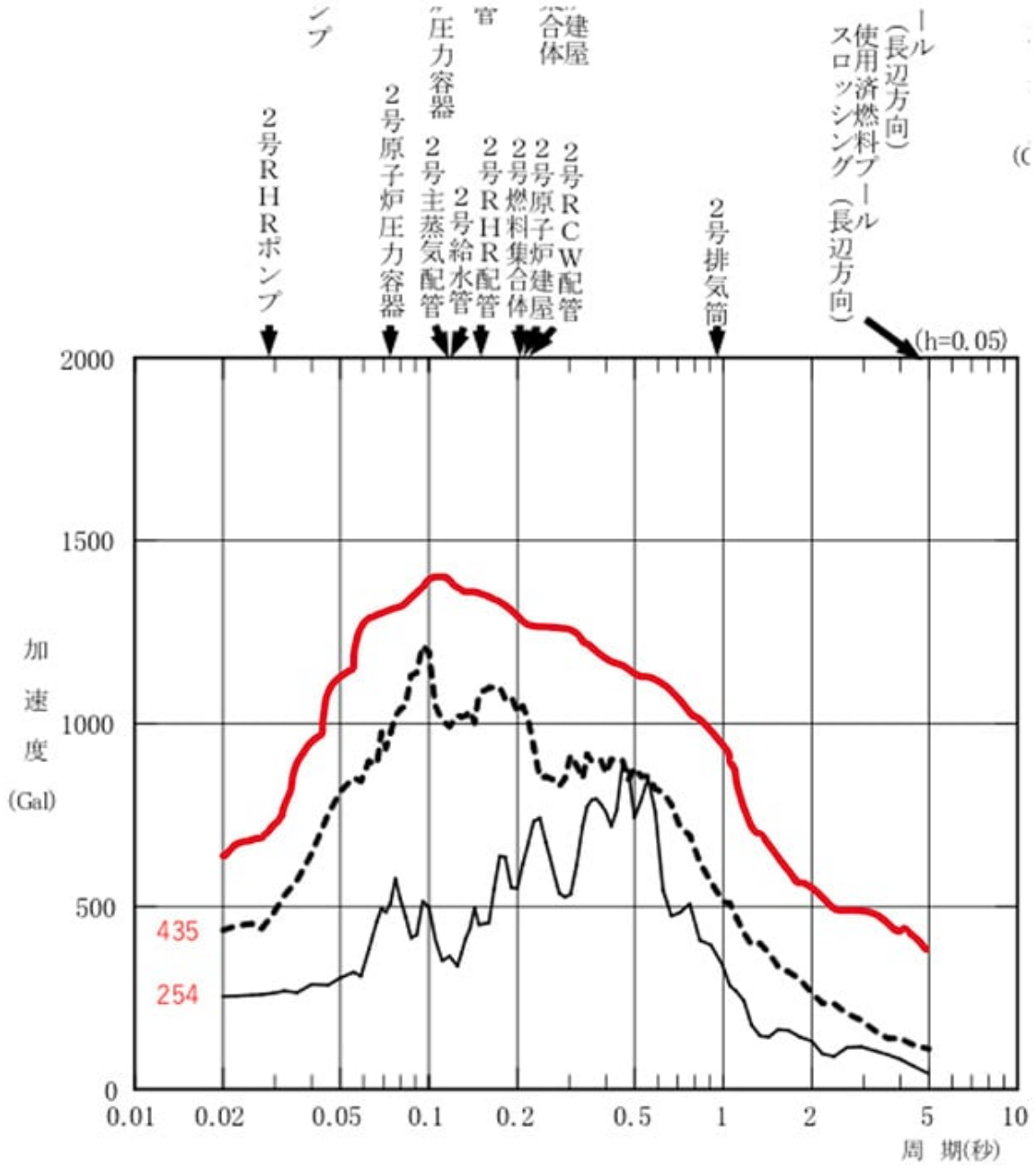
??F????????????????G????????????????G????????????
????????1G?980????????980??1G????????????????????????????

????????????2??
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????2?“?”????1000??

????2????????1000????????????????1000????????????????

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????????????????????600????1000??
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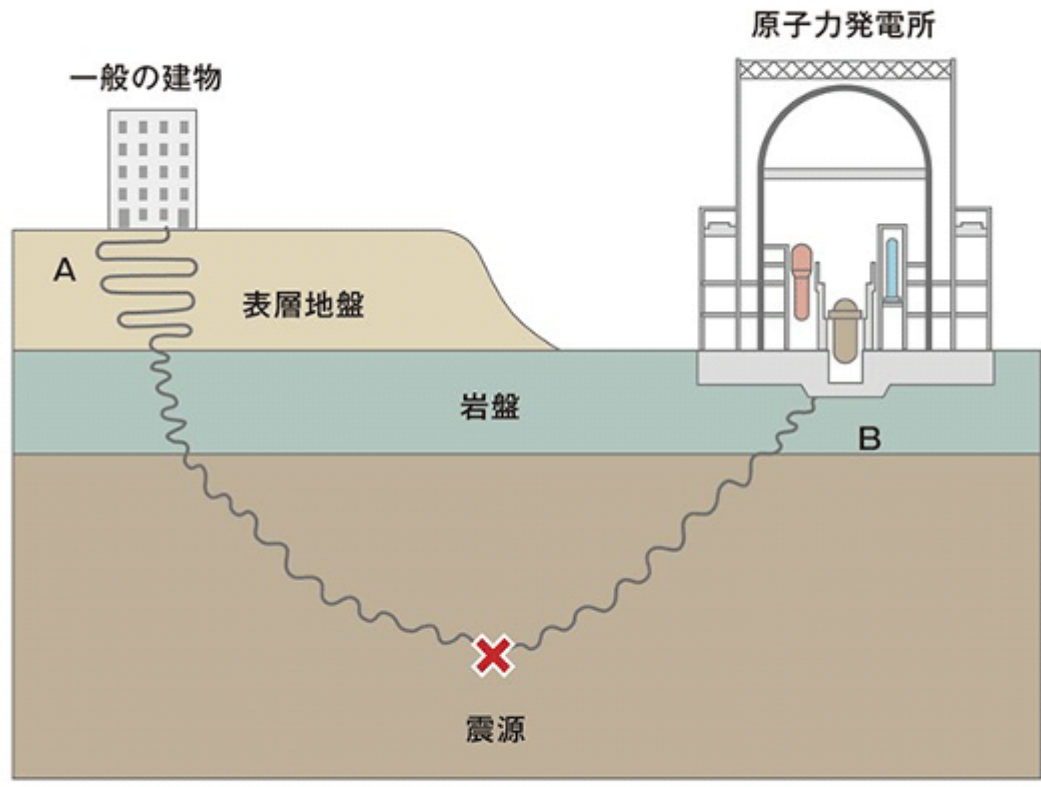
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????????600????1000????????????????????——????????????????????????????

????????????????2,112????????200????????????????3,406????????????????5,115????????????
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堅固な地盤（岩盤）での揺れは表層地盤に比べ1/2~1/3程度

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

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?? ? · Wednesday, January 24th, 2024



Cinefootage Visuals/iStock

2023?12????????????COP28??

COP28??2050????????????????????????10??
??transition away from fossil
fuels??

???COP28?2??28????
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????????????????????1928??
 ???10????????????????????
 ???UAE?
 ???OPEC??2022??28??????????10.6????????????????
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Posted in ???, ????? | No Comments »

???CO2????????????????????????????

?? ?? · Saturday, January 20th, 2024



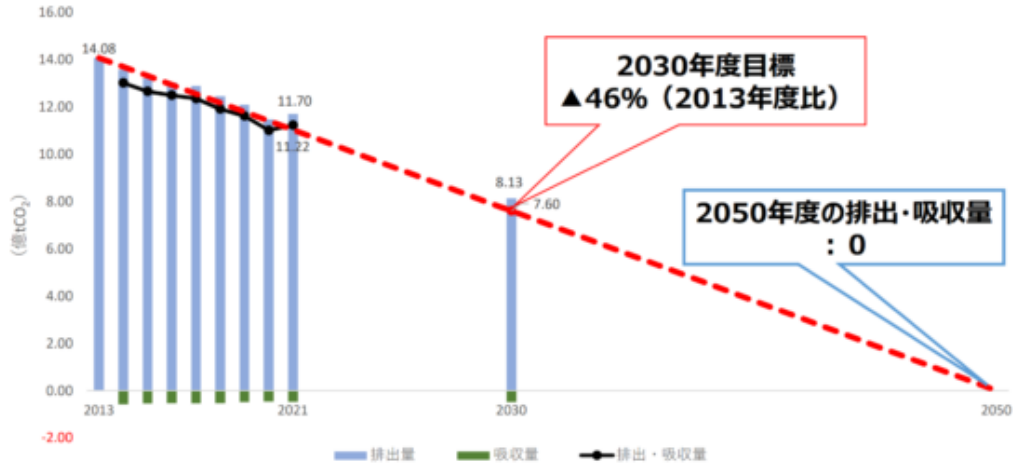
Slavica/iStock

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2030年度目標及び2050年カーボンニュートラルに対する進捗



- 2020年度からの増加については、コロナ禍からの経済回復により、エネルギー消費量が増加したこと等が要因と考えられる。
- しかし、2019年度からは3.4%減少しており、2030年度目標の達成及び2050年カーボンニュートラル実現に向けた取組については一定の進捗が見られる。



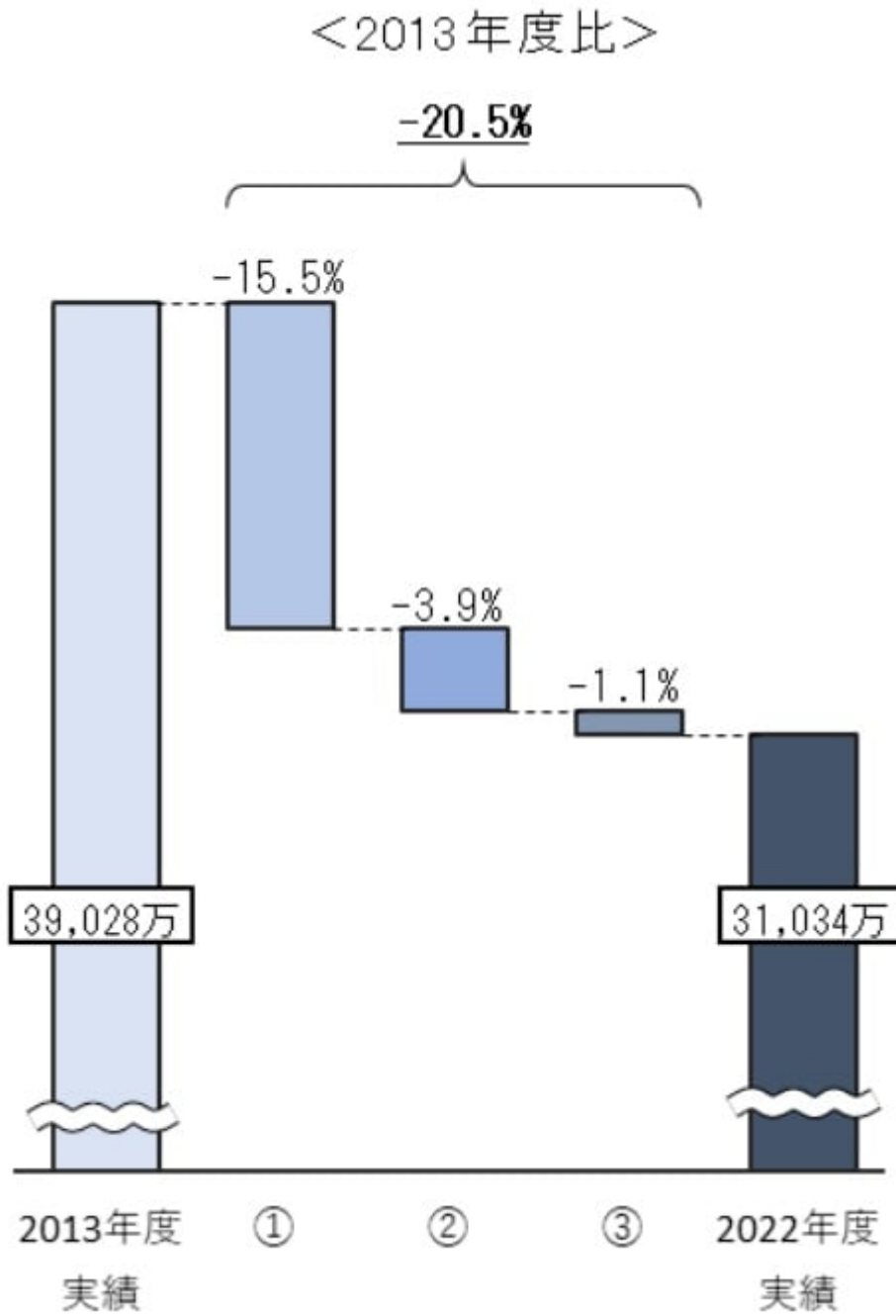
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????????2013????2022????CO2????????76????????????????

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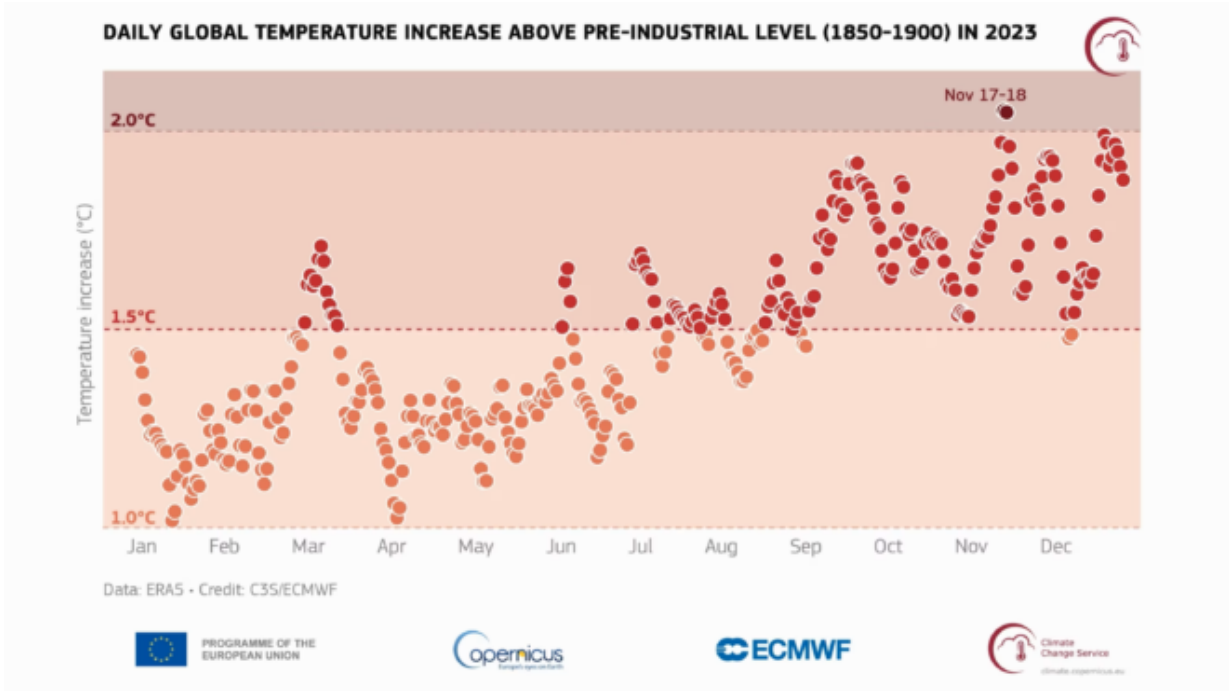
Posted in ??????????, ??, ????? | No Comments »

????????1.5????????????????

?? ?? · Wednesday, January 10th, 2024

EU????????????????????2023????????????????????1.48????????

????????1.5????????????????0.02????????????1.5????????????
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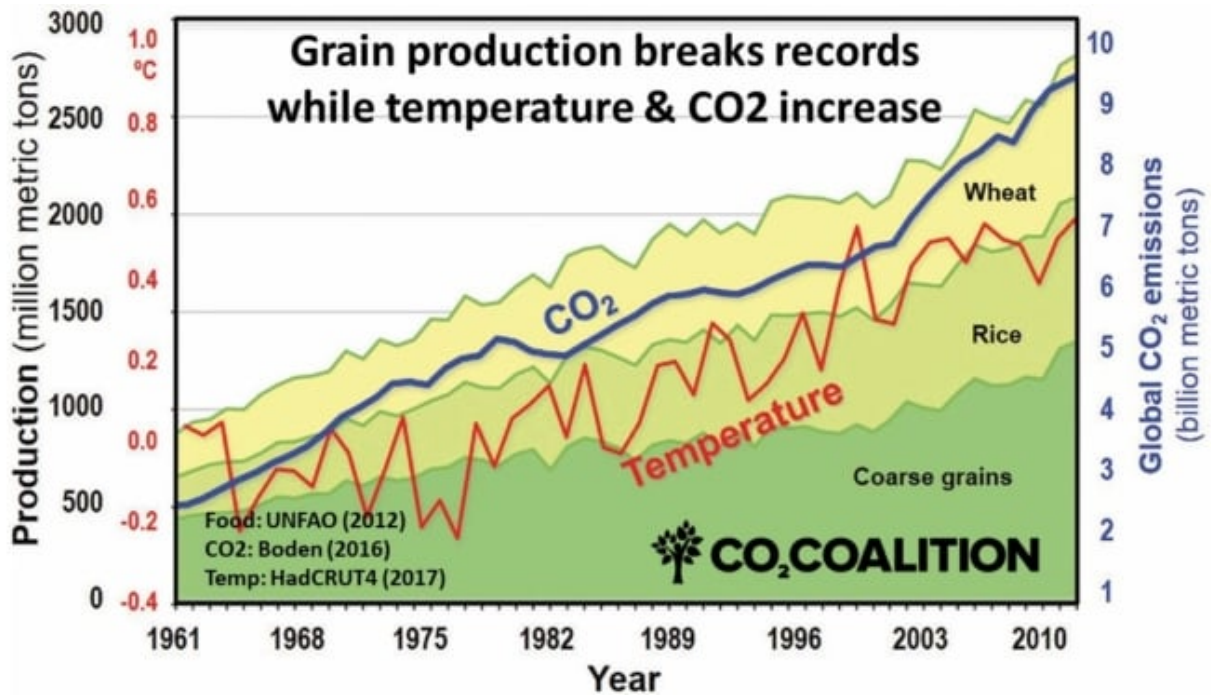
????1.5????(ABC News)

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CO????????????????

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CO2????????(CO2 Coalition)

??10????????WMO??????????4.5mm????????IPCC????????7mm????????????????????????????????

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??145??18??????????????41??????

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

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?? ?? · Sunday, December 31st, 2023



shotbydave/iStock



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

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?? ?? · Saturday, December 30th, 2023



CampPhoto/iStock

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21?4????????????????????????????????????28????????????????????????????????????67?????????????????
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Wikipedia??

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

COP28??????

?? ? · Tuesday, December 26th, 2023



Heiness/iStock

12????????COP28????????????????????????????????COP??????

??NDC??
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????1.5????2050????????????????????IPCC?6????????????????2025????????2030???43????2035?
??6??1.5??
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????????¹²??1.5????????????2025????????2035????60????????????????????26?27????2025????????
?NDC?????1.5????????????????????????47??

????????????1.5????????????????????IPCC????????2025????????2035??60????????????????
????????????????????????????recognize????????????2025????????????????????????????
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??NDC??2025????????20
35??60????????????????????????????????????2025????????2035??60????????????????????
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COP28????????????????????????????????1.5????????????????????????????????????
????????????????????????CO2????????????????????????????????

????????????28????1.5??
????????????????????????????????????8????????????????????????????2050??
????????????10??transition away from fossil
fuels)????????

2030 3 2 CCS 29

COP CCS

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COP28 OPEC

12 UAE

NGO COP

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2030 5.8 5.9 67 2050 2030 4 3,000 2050 75 68 69

1.5 1000

1.5?????

1.5

2021 1.5 2030 2010 45 2021 2022 2023 3

1.5 COP

1?https://unfccc.int/sites/default/files/resource/cma2023_L17E.pdf

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

????????SINO?Science in name only?

?? ?? · Saturday, December 23rd, 2023



metamorworks/iStock

1. COP28???

11?30????2??UAE????????COP28??90,000????????????????????

11?21?????She Changes
 Climate????????COP28????????????????????1.5°C????????????????????
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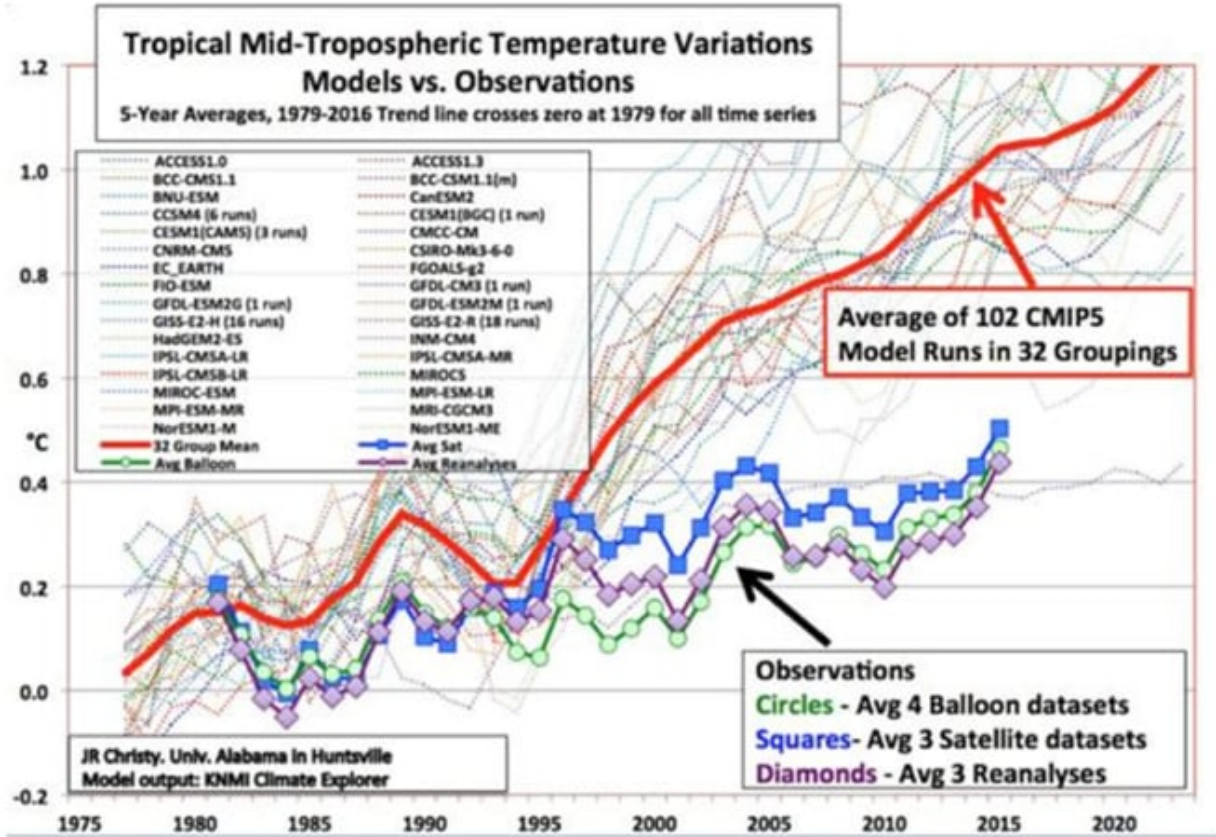
????????????????B.Sc????????????????PhD????????????????MBA????????????????
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COP28 ??????????????????????

COP28????????????NHK????????????? “?????”????????????? ?????? ?????????????
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????????2050????????75???Doomsday????
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1995????????????????????2015????????0.5?0.6??1995????Tippin
g Point??

3. Science in name only

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??2050????????????????????????????1????????????????????????

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??30??2050??
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4. ???

EU?????Science in name only??

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

????????????????COP????????????

?? ?? · Friday, December 22nd, 2023

????????COP28????????COP????????????????????????????????????

????????(phase out)????????????????????????????????(phase down)????????(transition away)????????????

COP????????

COP????????????????????????????????(UNFCCC)????????1994????????1997?COP3????????

????6????????1????????

????2015????????NDC????????2????????1.5????????2016????????

????COP????1.5????EU????????2021?COP 26????????

????COP????COP27????????1.5????

????????????????????????????????

????COP????

????COP????1????????UAE????????11????

????1.5????EU????CO????

?????????? “?? “???”2050?????????? “???”????????????”??????
“??“???? “??”??????????????

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????12?19????????????????????

COP28 ??????????????????

NHK????????COP28????????????????????

????????????????????????????????COP28????????????????????????????????

????????????????COP28??

??NHK????????????COP28????????????????????

DeepL?NHK????????transition away????????????

??Google????????????????????????????

????????COP28??
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- ?????????????????COP28?12?13????
- ?????????????10????COP28?12?13????
- 10????????????COP28?????12?13????
- ?????????????COP28????????12?13????
- ???COP28????????????12?17????
- COP28????????????1?????12?13????
- COP28????????????12?13????
- COP28????????????????????????12?14?BBC????

COP28????12?18??

(7) 公正な移行

COP27 で決定された「公正な移行に関する作業計画 (JTWP)」について、雇用、エネルギー、社会経済等の要素を含むこと、作業を 2026 年まで継続し、その時点で効果や効率性について評価を行い、継続を検討すること等が決定された。

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

????????????????????EV?????????????????

?? ?? ? - Thursday, December 21st, 2023



Ignatiev/iStock

EV??????...???????

12?17??7??????????EV????????????????????5?????

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EU 44

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44 16 17 no farmer, no food, no future?

44 17

44 EV

44 1400 11

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44 5 3 5

44 EV

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Posted in ???, ?? | No Comments »

COP28 ??????????????????????

?? ?? · Tuesday, December 19th, 2023



yudhistirama/iStock

NHK????????COP28????????????????????

COP28 ??????????????????????

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????????????COP28??

??NHK????????????COP28??

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28. Further recognizes the need for deep, rapid and sustained reductions in greenhouse gas emissions in line with 1.5 °C pathways and calls on Parties to contribute to the following global efforts, in a nationally determined manner, taking into account the Paris Agreement and their different national circumstances, pathways and approaches:

- (a) Tripling renewable energy capacity globally and doubling the global average annual rate of energy efficiency improvements by 2030;
- (b) Accelerating efforts towards the phase-down of unabated coal power;
- (c) Accelerating efforts globally towards net zero emission energy systems, utilizing zero- and low-carbon fuels well before or by around mid-century;
- (d) Transitioning away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, so as to achieve net zero by 2050 in keeping with the science;

Draft decision -/CMA.5?Outcome of the first global stocktake

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- calls on Parties ??COP??
- contribute to the following global efforts ?????????????????????????????????????
- in a nationally determined manner ???
- different national circumstances,..., in a just, orderly and equitable manner ?
??
- accelerating action in this critical decade??????2020??

??300????????????????????????????????6????????????????????

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??2030????????1????????????????2030????????5.8-5.9????2050????????5????????????????????

67. *Highlights* the growing gap between the needs of developing country Parties, in particular those due to the increasing impacts of climate change compounded by difficult macroeconomic circumstances, and the support provided and mobilized for their efforts to implement their nationally determined contributions, highlighting that such needs are currently estimated at USD 5.8–5.9 trillion for the pre-2030 period;⁵

68. *Also highlights* that the adaptation finance needs of developing countries are estimated at USD 215–387 billion annually up until 2030, and that about USD 4.3 trillion per year needs to be invested in clean energy up until 2030, increasing thereafter to USD 5 trillion per year up until 2050, to be able to reach net zero emissions by 2050;⁶

1????1????????????150???1?????15??2030??????????????????
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????COP????????????????

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

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GEPR??? · Thursday, December 14th, 2023



deepblue4you/iStock

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E????????????????GHG????????????

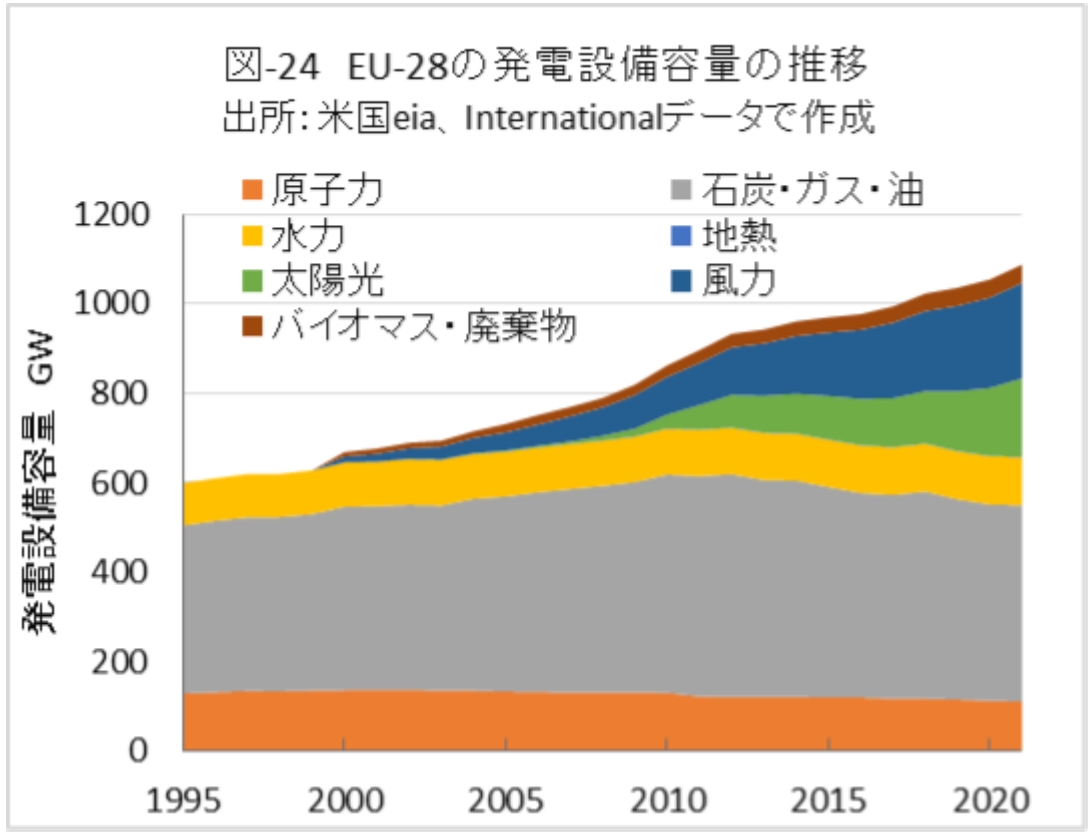
?23??-

??EU-28??10??

GHG????????????????????????????EV??VR
E????????????????????

EU??VRE???

?24??EU-28??2000????????VRE????????2010?????????????????
?????23????????????????????2010????????????????????



VRE????????????????GHG????????????????????VRE????????????????????????????????CO2????????
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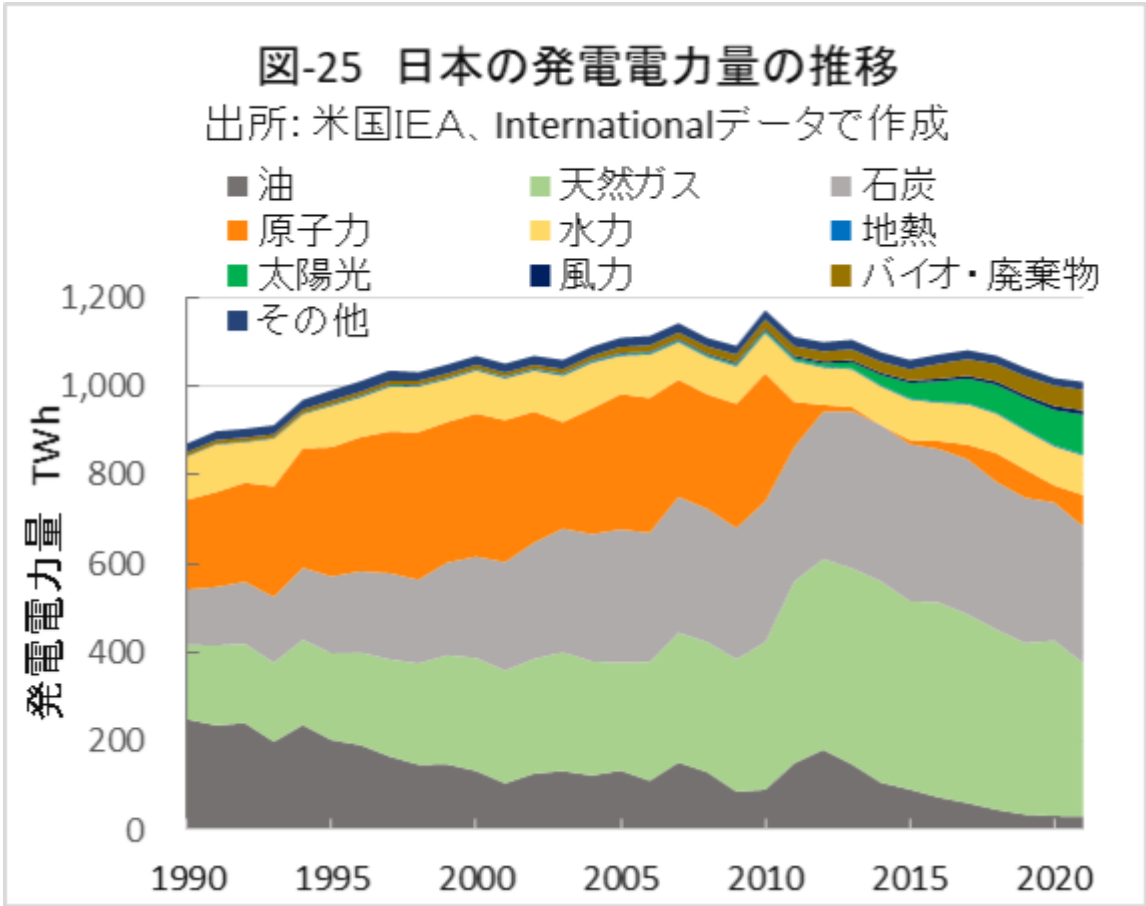
VRE??

????????50%????????????????????????????10%??
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????EU-28??VRE????????????????????GHG????????VRE????????????????????????????GHG?????
??VRE????????????????????????????????

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??2009????????????????????????



2011年3月の東日本大震災以降、天然ガスが25%に増加し、LNGの消費量が急増している。

2012年7月のFIT制度の導入により、太陽光発電の出力が急増し、2017年にはFIT制度の適用範囲が拡大された。

再生可能エネルギー(VRE)

VREはGHG削減に有効なエネルギー源である。

VREの導入はエネルギー安全保障に貢献する。

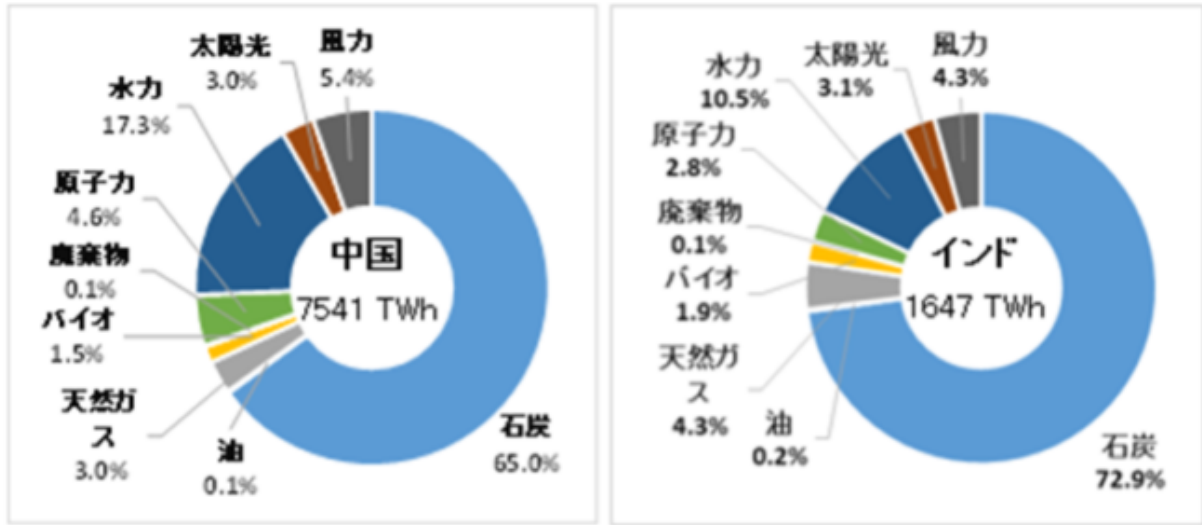
VREの導入はエネルギーコスト削減に効果的である。

GHG削減の観点から、VREの導入を促進する必要がある。

2026年までにVREの出力を2/3まで増加させる必要がある。

図-26 中国とインドの電源構成 (2019年)

出所:IEA データで作成



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????GHG????2/3????????????????????2050?GHG????????????????????GHG????????????????

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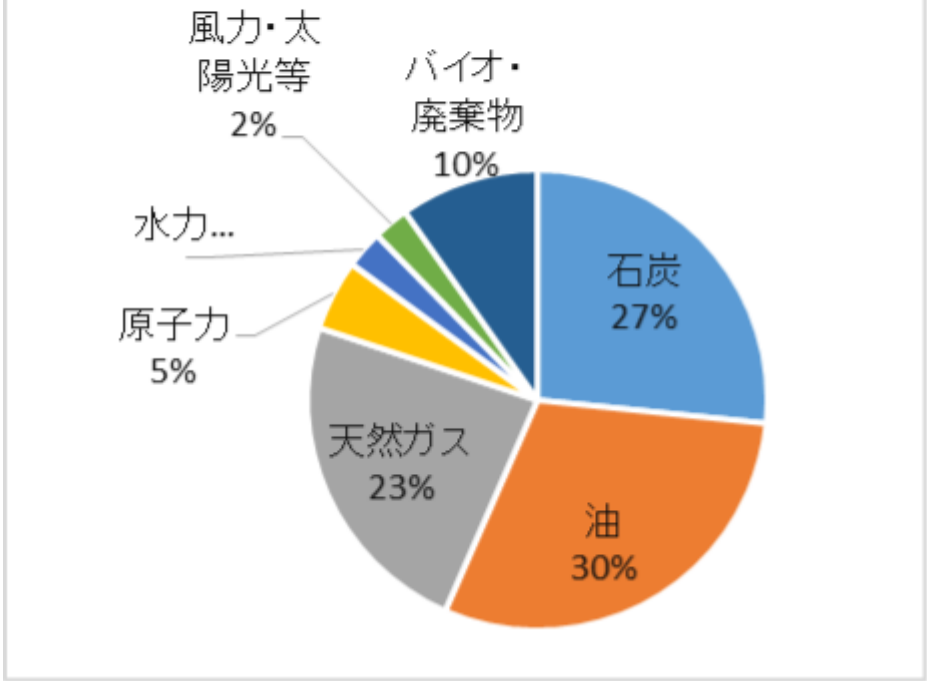
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2050?GHG??GHG????????????????

????????GHG??VRE????????????????27????

????????TES????????????????27%????????

図-27 世界の一次エネルギー供給量
(2020年) 出所: IEAデータ



28??29????????????????CO2??????????

図-28 グループ別 一次エネルギー供給量
(2020年) 出所: 米国eia、Internationalデータ

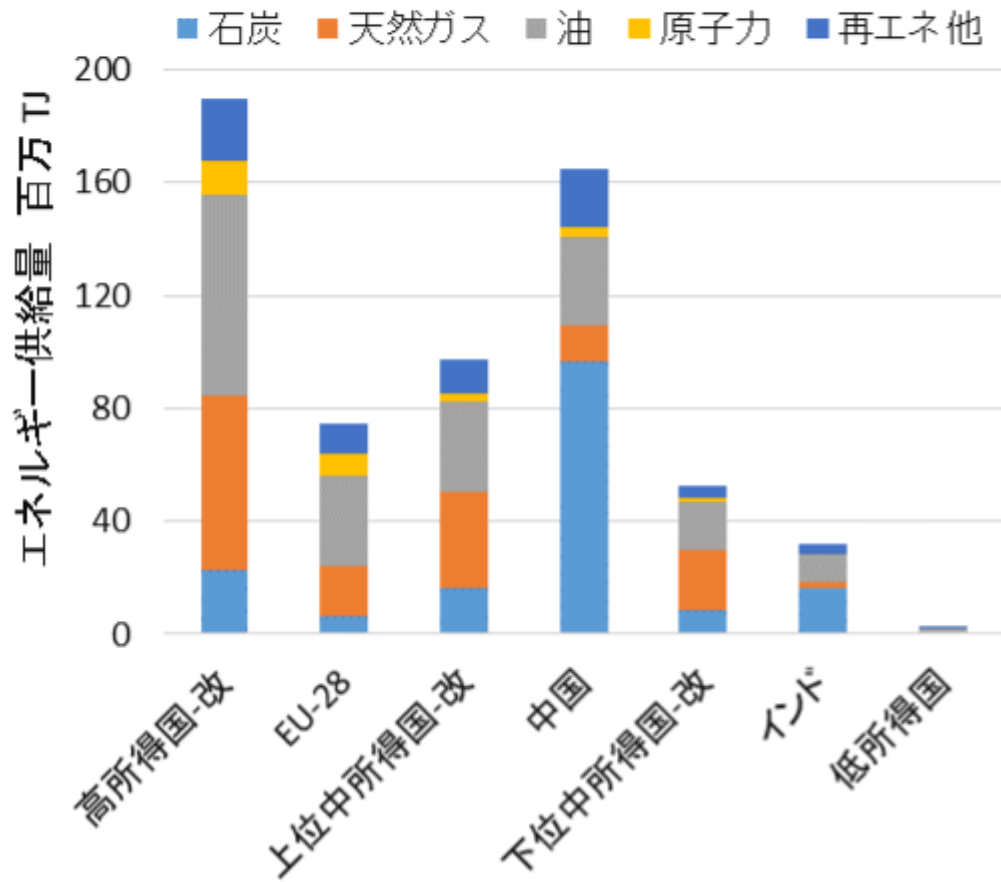
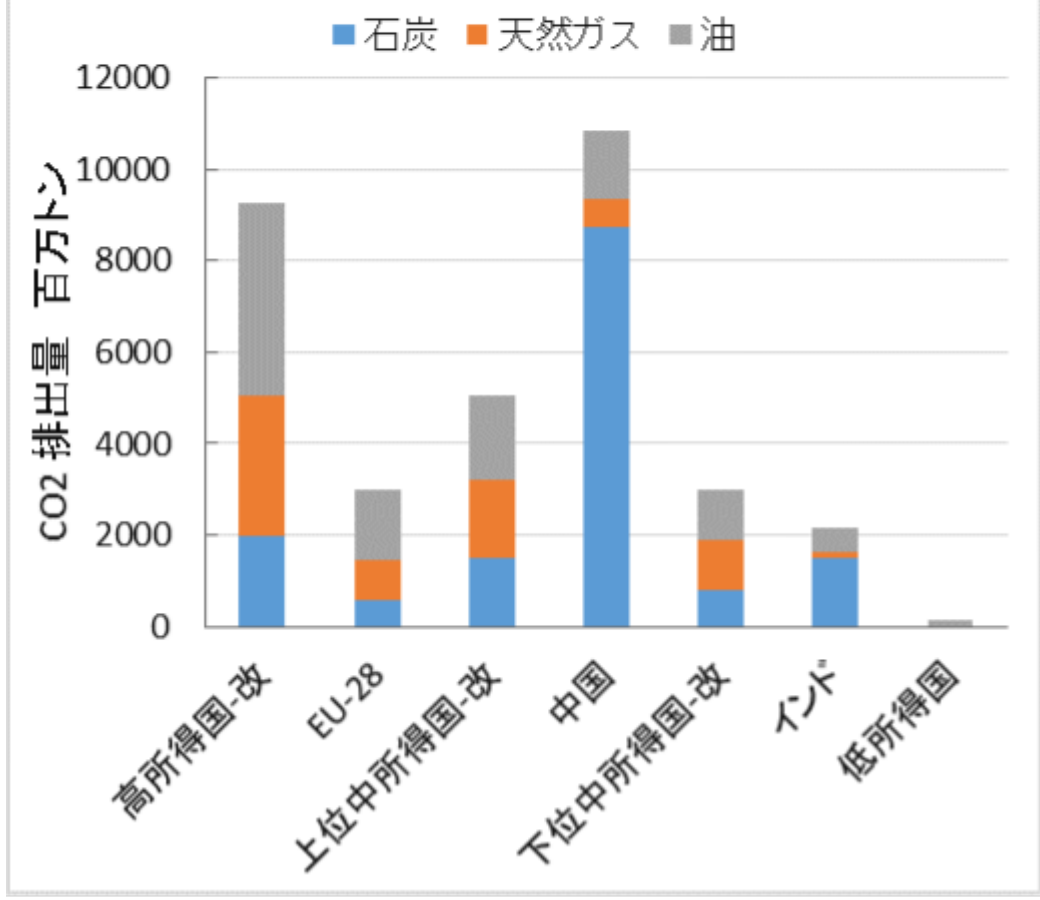


図-29 グループ別燃料燃焼CO2排出量 (2020年) 出所: 米国eia, Internationalデータ



2020年、世界のCO2排出量は52%増加し、16%減少した。

CO2排出量は0.56トンを削減した。

LCAによると、LNGはCO2排出量を0.6から0.65に削減し、35%削減した。

18%削減し、IEAによると2020年のGHG排出量は1.57トンを削減した。

70%削減し、GHG排出量を1.1トンを削減した。

削減した。

30%削減し、1970年からの削減率を向上させた。

削減した。

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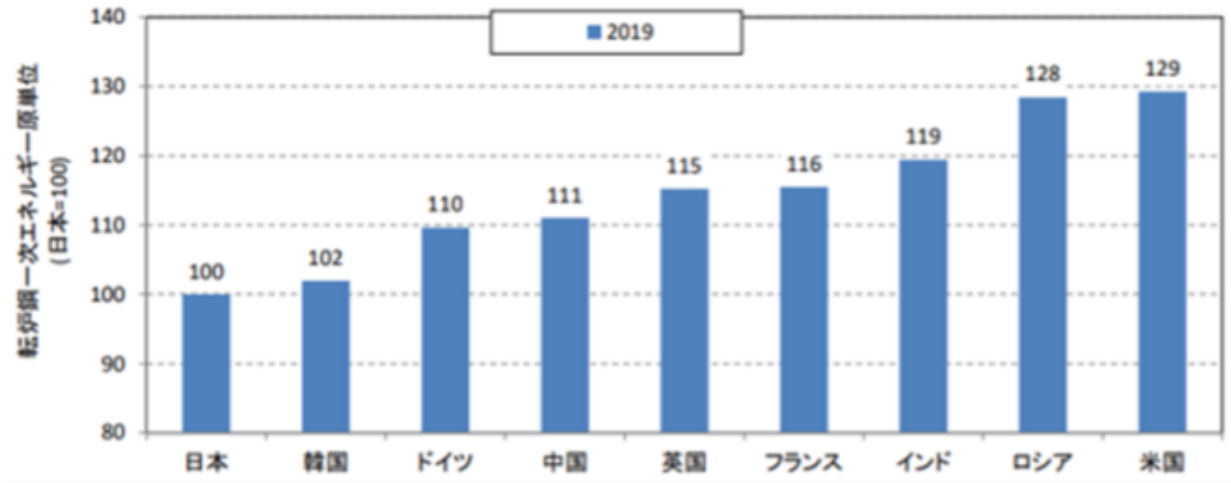
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??30????????????
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図-30 高炉-転炉鋼の一次エネルギー原単位 (2019年)
出所：2019年時点のエネルギー原単位の推計(鉄鋼部門-転炉鋼)、RITEほか



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??CO2????????????

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GHG????????????????????GHG????????????????????????????????2050????????????GHG????????????
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GHG??EU????????GHG???60?70%????????????????GHG?
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Posted in ??????????, ??? | No Comments »

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GEPR??? · Monday, December 11th, 2023



deepblue4you/iStock

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Charts??
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2045??6?????4????????????????????????3?????
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 X??CO2????????????????????????3????????????

表-3 ドイツ2045年GHGネットゼロの風力・太陽光発電の変動対策

分類	技術名	電力不足時の対策	電力余剰時の対策
季節変動と発電ピークの抑制	風力と太陽光比率の適正化	風力発電と太陽光発電の季節変動を相殺	
	太陽光発電の抑制	ピーク発電量が大きい太陽光発電比率を抑制	
電力貯蔵	定置バッテリー	高応答性の電力供給	余剰電力で充電
	移動(車載)バッテリー	同上	電力余剰時に充填負荷をシフト
	揚水発電	同上	余剰電力で揚水
余剰電力の燃料変換	電気分解H2製造		高応答性の電力利用、H2貯留可
	H2ベースのメタン合成		発電・加熱用燃料
	H2ベースの液体燃料合成		移動体燃料、貯留可
その他	メタン・水素複合サイクル発電	ディスパッチ可能電源	
	ヒートポンプ熱電併給複合地域暖房	熱電併給で暖房	ヒートポンプで暖房と蓄熱
	電気発熱体	常時使用だが、CO2フリーのボイラ等代替	
輸出入	電力輸出入	再エネ発電の地域差を利用し欧州電力網を強化して輸出入	
	合成燃料・バイオ燃料輸入	国内燃料変換生産の不足を補完	
考慮されていない技術	CCS	CCSが石炭火力の延命になるという環境団体の反対による	
	原子力	原発分だけ再エネを減らせるが、福島第一事故で脱原発を決定	

出所: フラウンホーファーISE, 「気候中立的なエネルギーシステムへの道」, 2021年11月改訂の情報で作成

VRE??
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1990????????????CO2????CCS????????????????2010????CCS????????????????2015????????????CCS
????GHG????????????????????????????????

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VRE????????????????VRE????????????????????????????????????

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2050????????????????????????????????

?? ?? · Sunday, December 10th, 2023

????COP28??



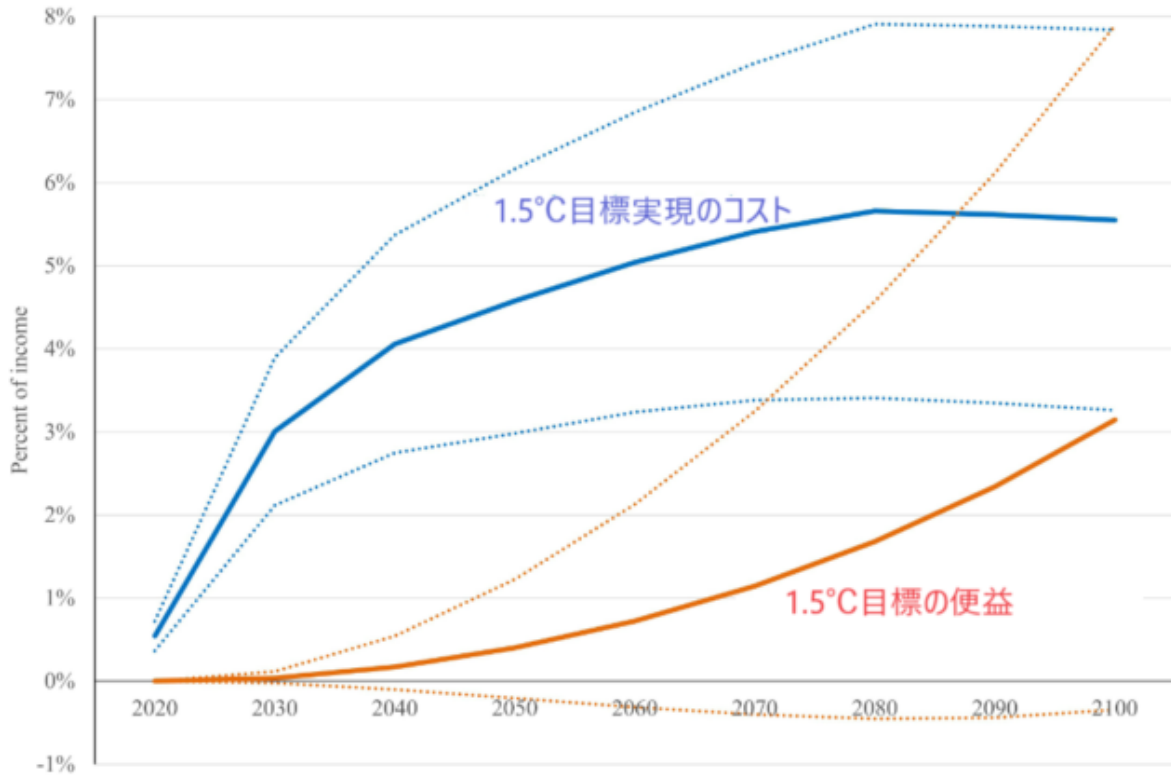
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1.5????????????2?10?

??Richard
S.Tol????????????????????????61????????39????????????????????????????????????

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????????3.1????



1.5°C (Tol)

IPCC SSP5-8.5 2100

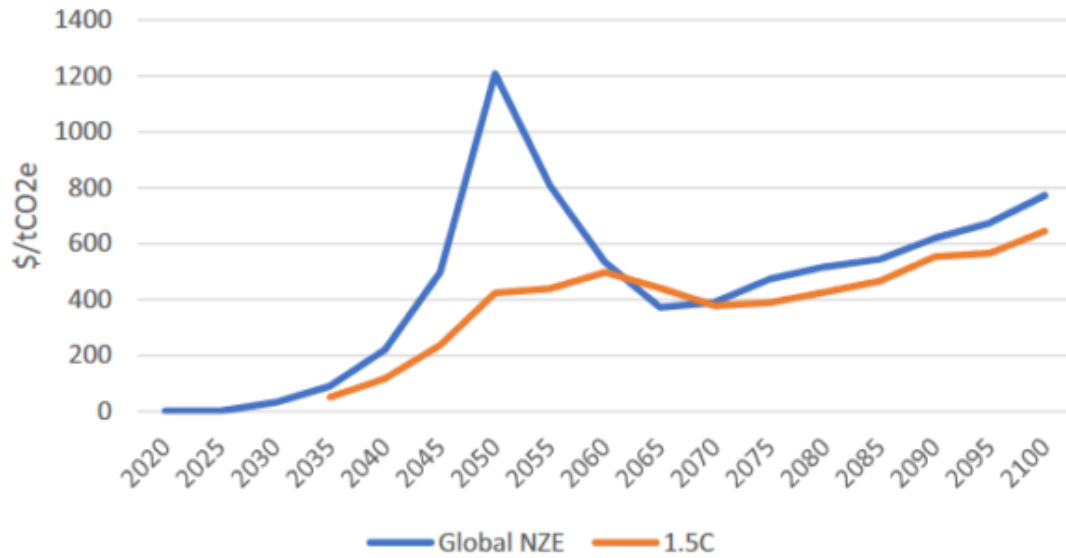
1.5°C

2100

1200

Jennifer Morris et al. 2050 CO2 1200

Global Emissions Price



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wildpixel/iStock

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2020????????????????????6%????????3%????????5????????????????????????????
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14??15??7??
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EU-28????????????????GHG??

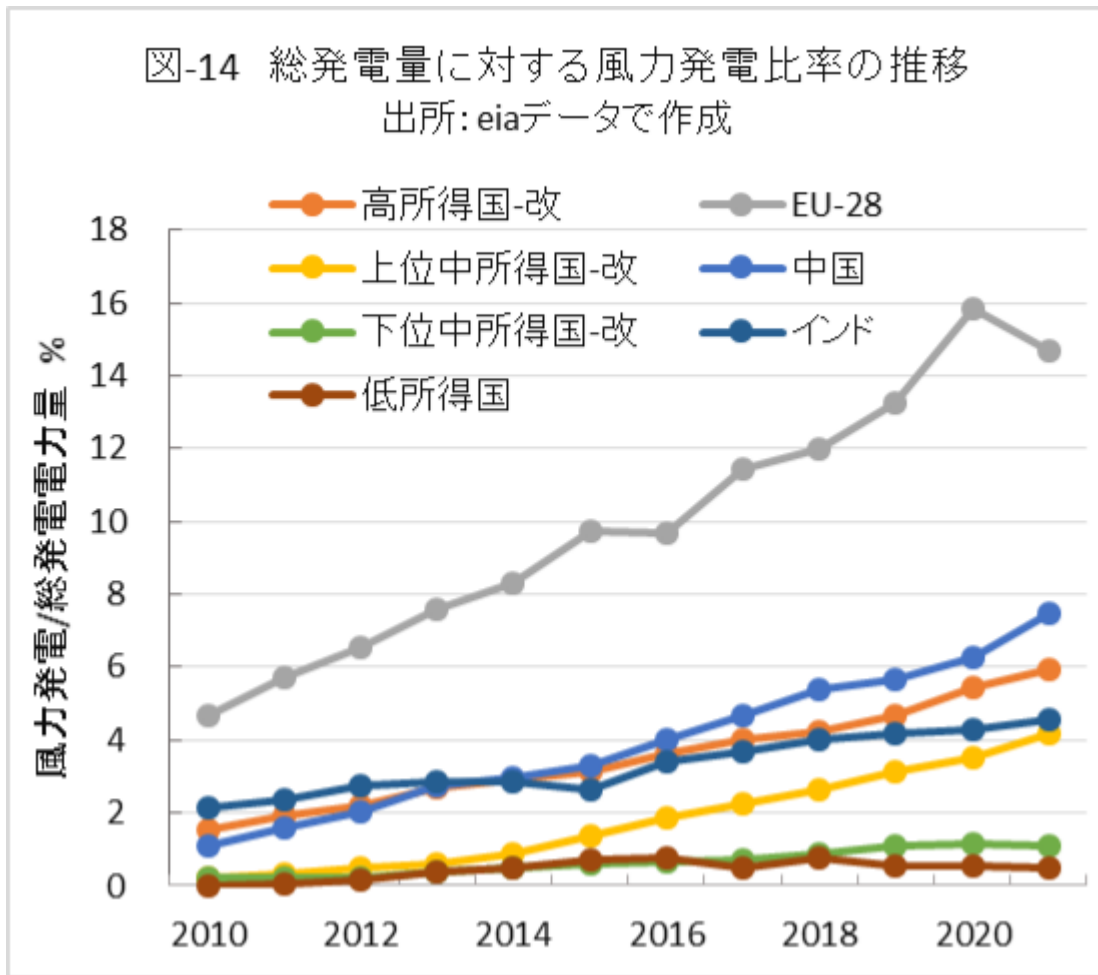
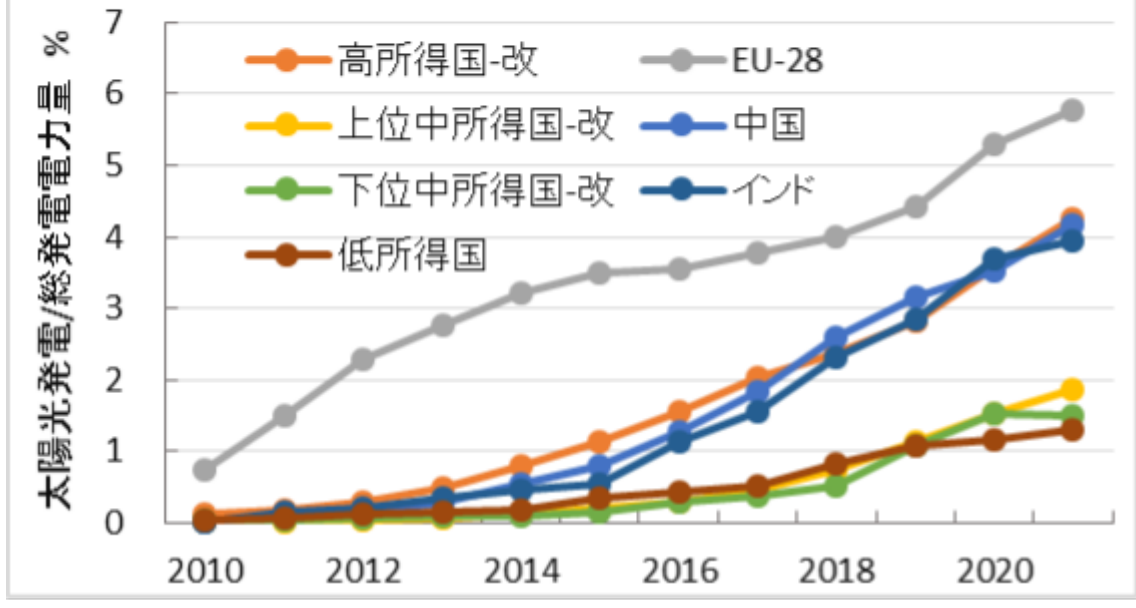


図-15 総発電量に対する太陽光発電比率の推移
出所: eiaデータで作成



Variable Renewable Energy, VRE GHG VRE GHG EU-28 GHG

VRE kW VRE kW VRE VRE

VRE EU-28 VRE VRE

VRE VRE VRE

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VRE Energy-Charts

Energy-Charts?

Energy-Charts ISE

30

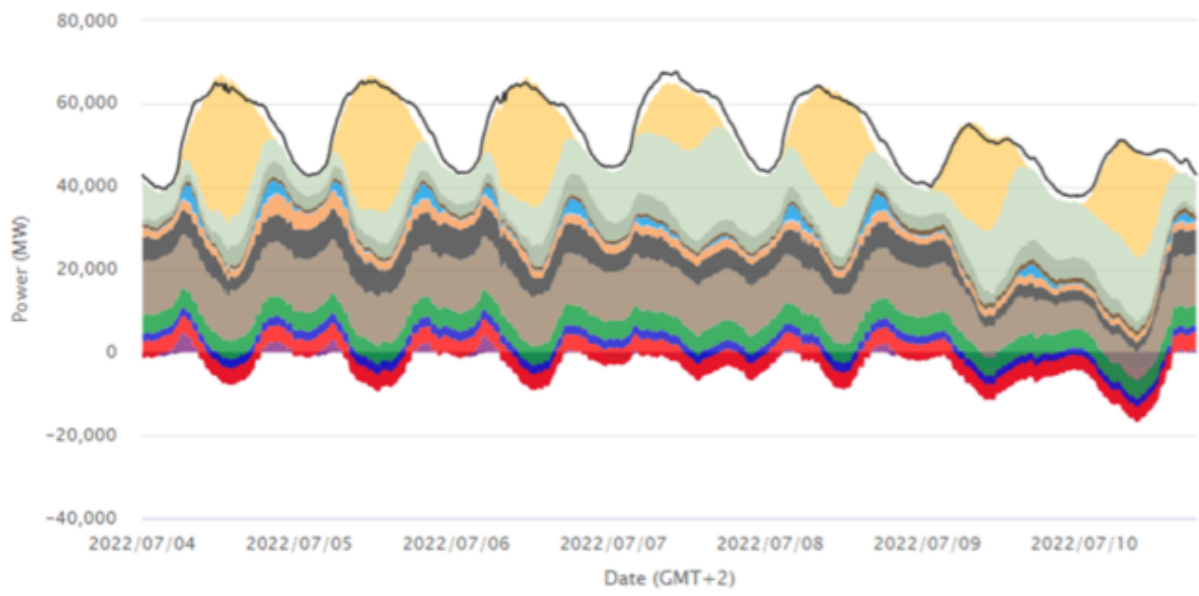
CO2

Energy-

Charts????????????2022??27??74??10??
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Public net electricity generation in Germany in week 27 2022

Energetically corrected values



Energy-Charts.info - last update: 2023/06/02 18:13 GMT+2

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?2?2022????????????????????????????????????1?kWh?1000TWh????????????????????????????????????
????????????????25%????????12%????????

表-2 ドイツの電源構成 (2022年公共正味発電電力量)

電源	正味発電電力量		正味発電容量 GW	設備利用率 %
	TWh	%		
太陽光	57.6	11.7	64.16	10.2
陸上風力	98.2	20.0	56.91	19.7
洋上風力	24.8	5.1	7.89	35.9
非再生エネルギー廃棄物	5.3	1.1		
再生エネルギー廃棄物	4.6	0.9		
その他	0.6	0.1		
貯水式水力	1.1	0.2		
地熱	0.2	0.0		
ガス火力	45.2	9.2	33.84	15.2
油火力	1.0	0.2	4.77	2.4
瀝青炭火力	55.4	11.3	19.06	33.2
褐炭火力	105.9	21.6	18.69	64.7
バイオマス	41.9	8.5	8.91	53.7
流れ込み式水力	15.8	3.2	4.94	36.5
原子力	32.8	6.7	4.06	92.2
年間正味発電電力量	490.4	100.0		
電力輸出入(輸入-輸出)	-27.6	-5.6		
揚水発電発電電力量	6.0	1.2		
揚水発電ポンプ動力量	-8.1	-1.7		
年間電力負荷量	482.3			
年平均1日発電電力量	1,344.0	GWh		
年平均発電量	56.0	GW		

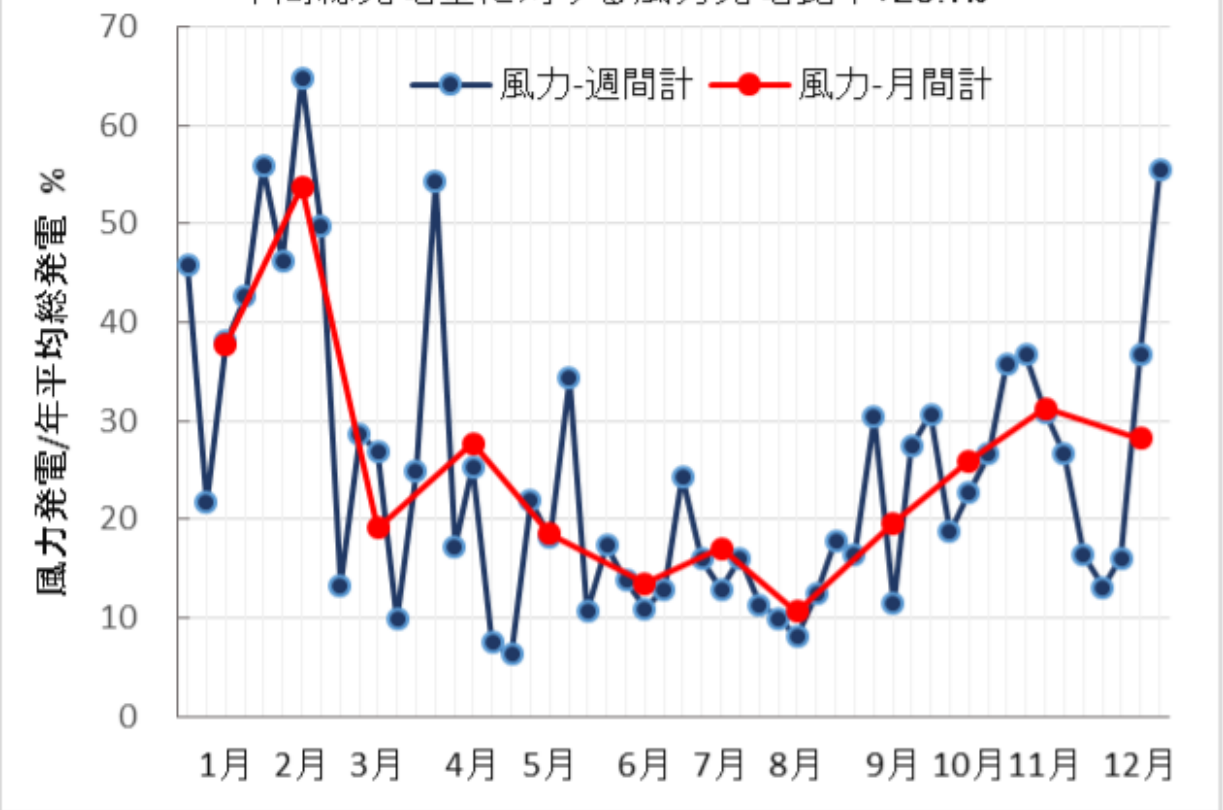
(注記)
 1) 公共正味発電電力量は、自家発を含まない、電力ユーザーのコンセントから出て消費される値。
 2) 太陽光、風力の発電容量は年間平均値、その他は2022年末の値。
 3) 電力負荷量は電力系統に投入された値。

16% 2022年 100%
 6% 65% 25% 10% 60%
 0.3 2.6
 1
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図-16 ドイツの風力発電電力量の変動(2022年)

出所: Energy-Chartsのデータで作成

年間総発電量に対する風力発電比率:25.1%



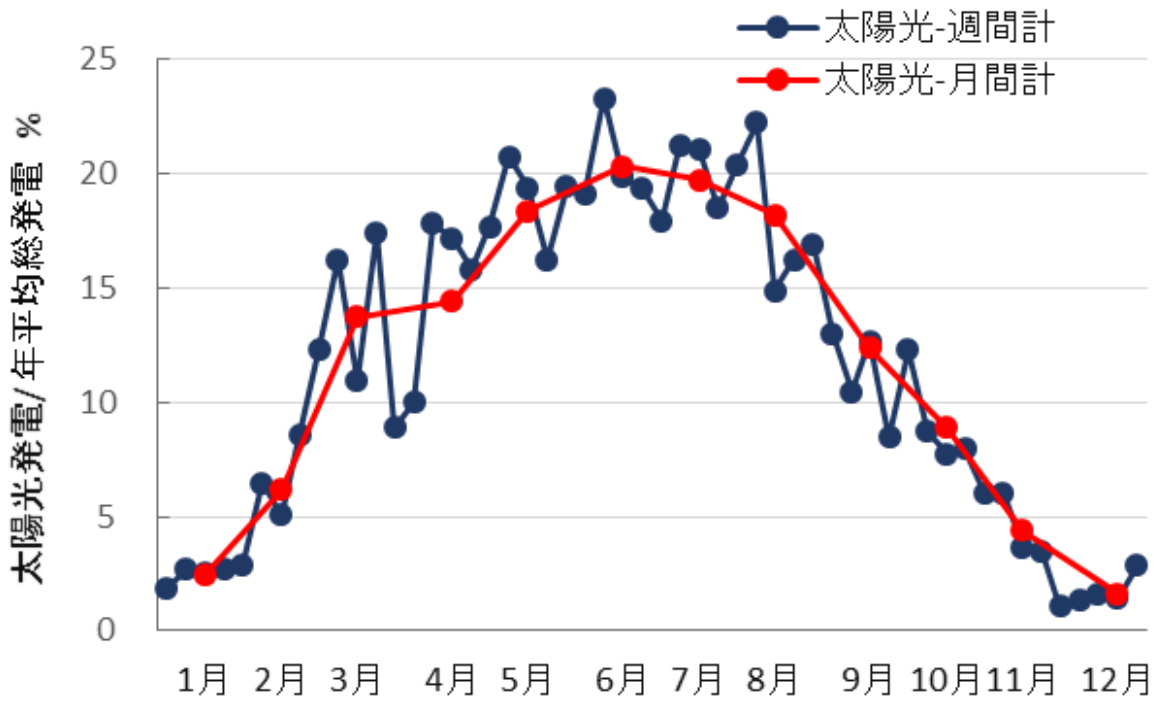
17% 12% 23% 0.12.0

0.14 1.7

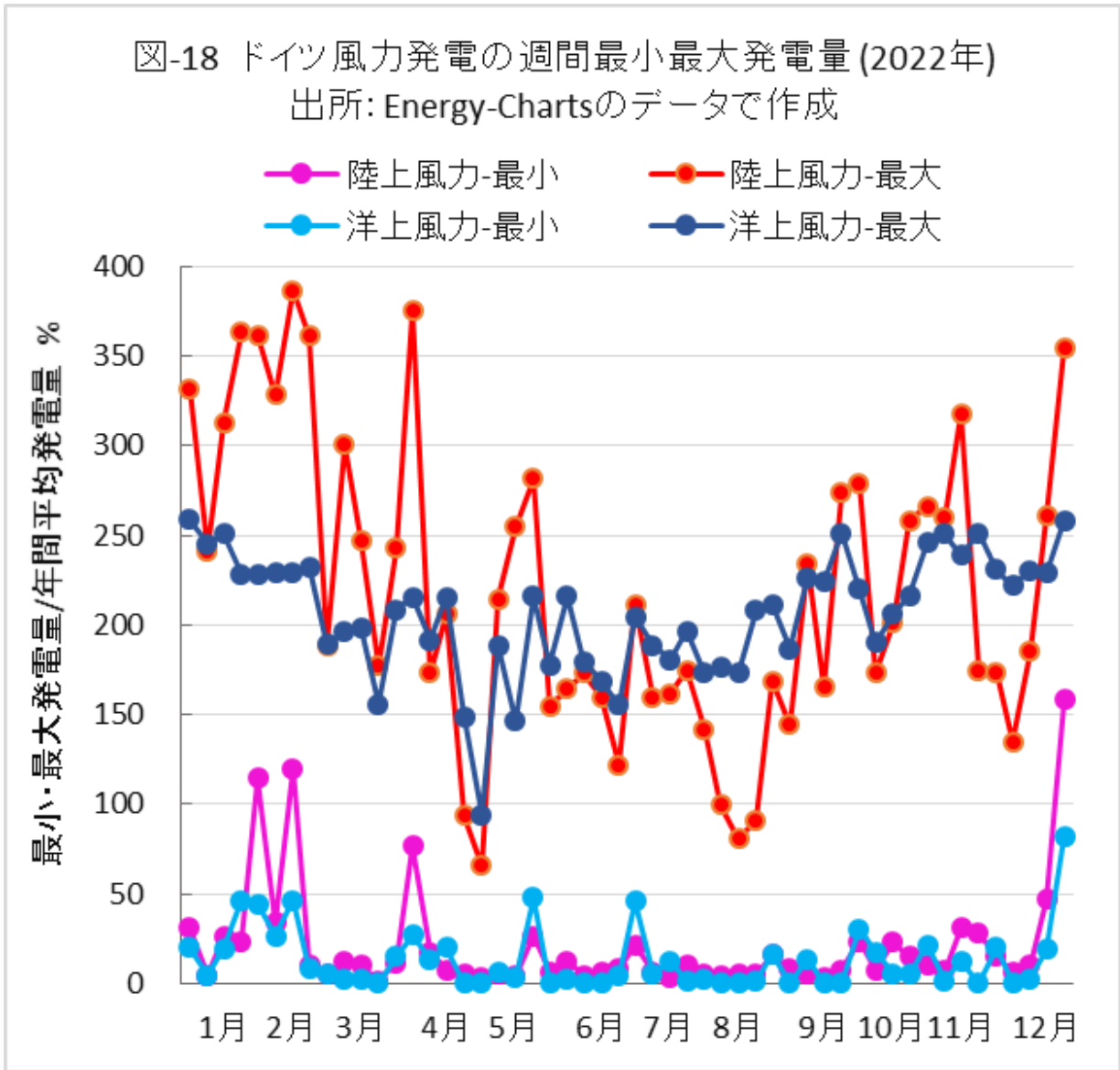
図-17 ドイツの太陽光発電電力量の変動(2022年)

出所: Energy-Chartsのデータで作成

年間総発電量に対する太陽光発電比率: **11.7%**



18% 10% 4%



?19??1????6??????????????
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?? ?? · Thursday, December 7th, 2023



alashi/iStock

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2020?6????????????CO2??2020?6?17????????????????????????????????CO2????
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?? ?? · Thursday, December 7th, 2023



HunterBliss/iStock

1. IPCC?????

IPCC?CO2????????Princeton????????1??????1967??3??????1975??????????1979??MIT????????
?R. Newell ??????????????

????DOE??1979????????????????????????????????????CO2????????????????????????¹⁷?R.
Newell?????????????R. Cess????????????????Lawrence Livermore?????????????????R.
Newell????????????????????

1986????????????????2????1988????????????????????????????????????IPCC????????????????????
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??1990??Hadley????????????????????CO2????????????????????????????CO2????????????????
????CO2????????????????????????????????

Hadley?????IPCC Working
Group1?????IPCC??R.
Courtney????????????????????

R. Courtney, ." Global Warming : How It All Began ",(1999)

????CO2????????????????????fake science????????????R. Newell????????IPCC????????????R.
Cess????CO2????????????????S. Schneider?J. Hansen? M. Schlesinger?T.
Wigley????????????????????????????????????

R.
Cess????????????????????????????????CO2?300ppm??600ppm????????????????????3????????????????
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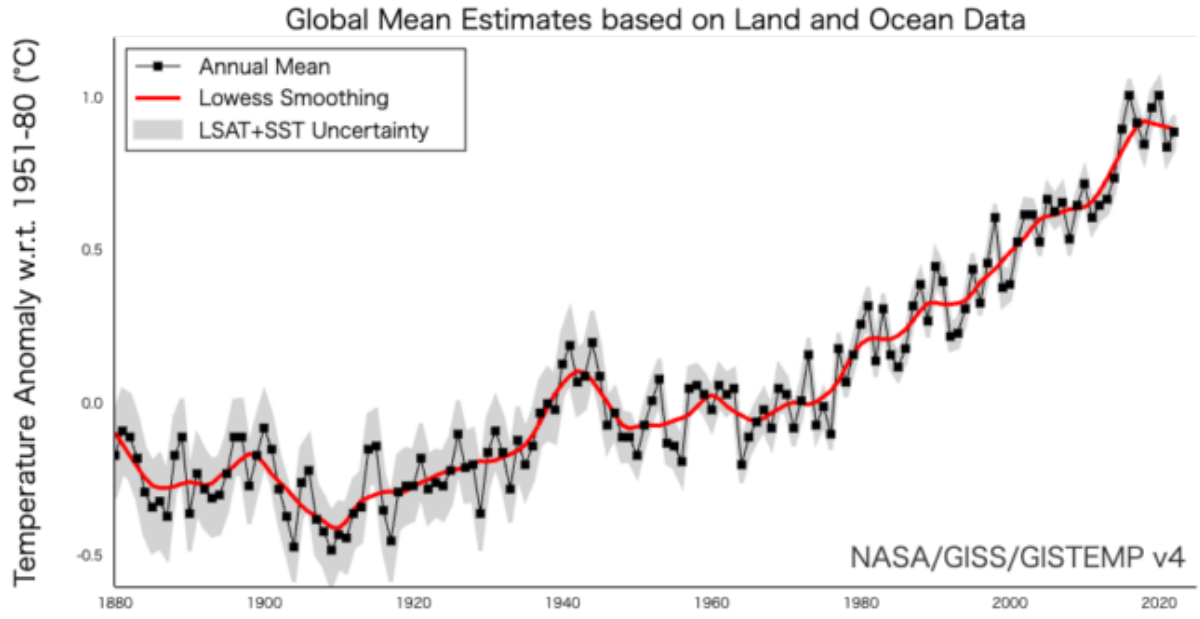
??Green New Deal???Clean Power
Plan??????2015????????????????????????????EV????????????????????????????2050?Net
Zero????????????????????????2020?10????????????2050?Carbon Neutral??????????

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

CO2????????????????????????NASA GISS????IPCC?WMO?NOAA????????????????????NASA
GISS?Director?1981-2013?????J. Hansen?????G. Schmidt????????????????????????

J.
Hansen?1988??99?CO2????????????????????????????????
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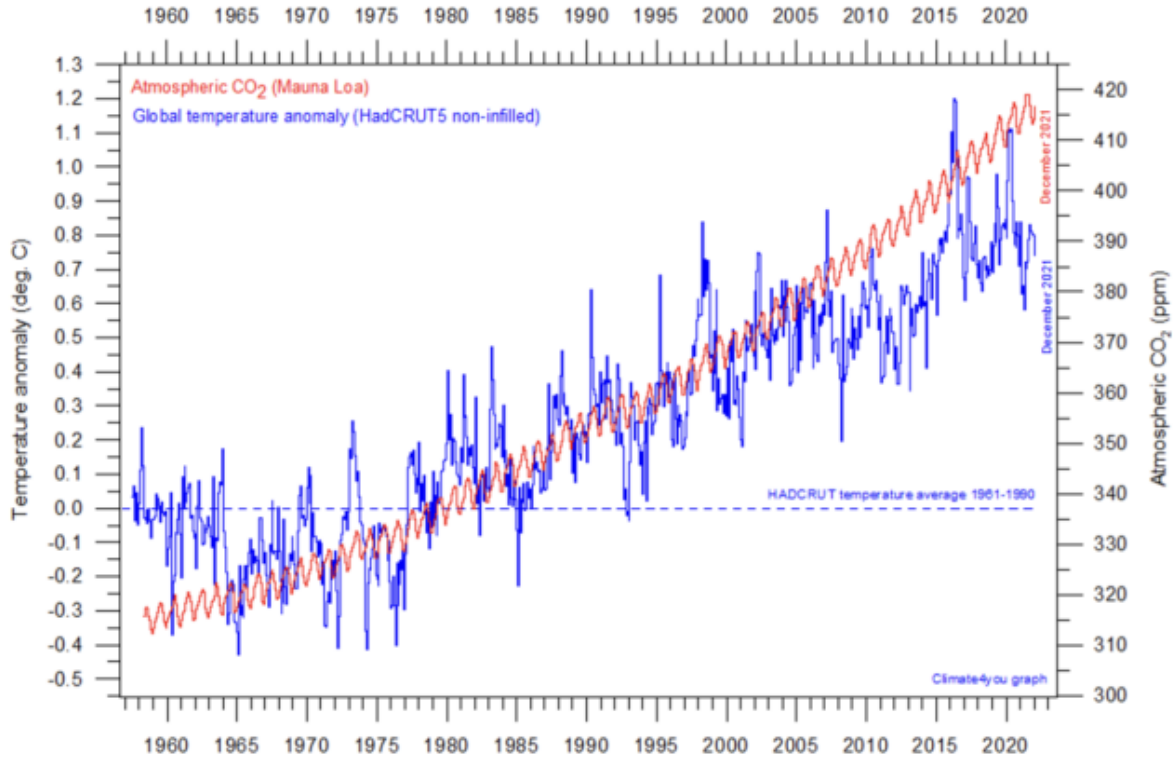
<https://realclimatescience.com/overwhelming-evidence-of-collusion/>



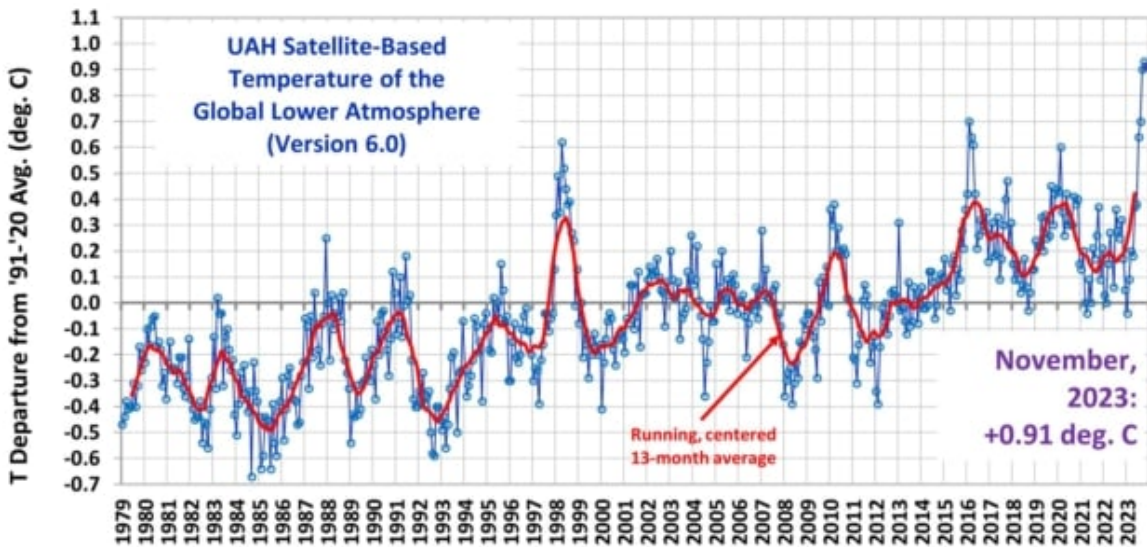
Data.GISS: GISS Surface Temperature Analysis (GISTEMP v4) (nasa.gov)

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GISS?????????????????????HadCRUT5?UAH?????????????????????CO2?????????????????2023????
?????El Nino?????????????????????



<https://www.climate4you.com/>



<https://www.drroyspencer.com/latest-global-temperatures/>

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 ?????????2016?9??24-53??



Newton Special

熱波、大干ばつ、集中豪雨 —— 世界を襲う気象災害
異常気象と地球温暖化の脅威

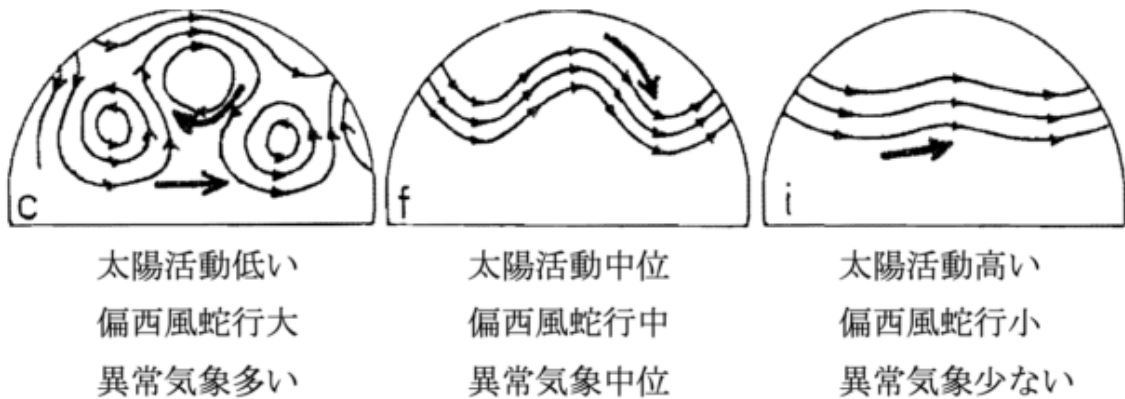
協力 江守正多 / 木本昌秀 / 塩竈秀夫 / 坪木和久 / 森 正人 / 渡部雅浩
 執筆 宮内 諭 (編集部)

現在、地球は過去に例を見ないペースで「温暖化」が進んでいる。異常気象と地球温暖化はどのように関与しあっているのだろうか。そして、今後、地球環境はどのように変化していくと考えられているのだろうか。

Amazonでのご購入はこちら  Amazonで買う

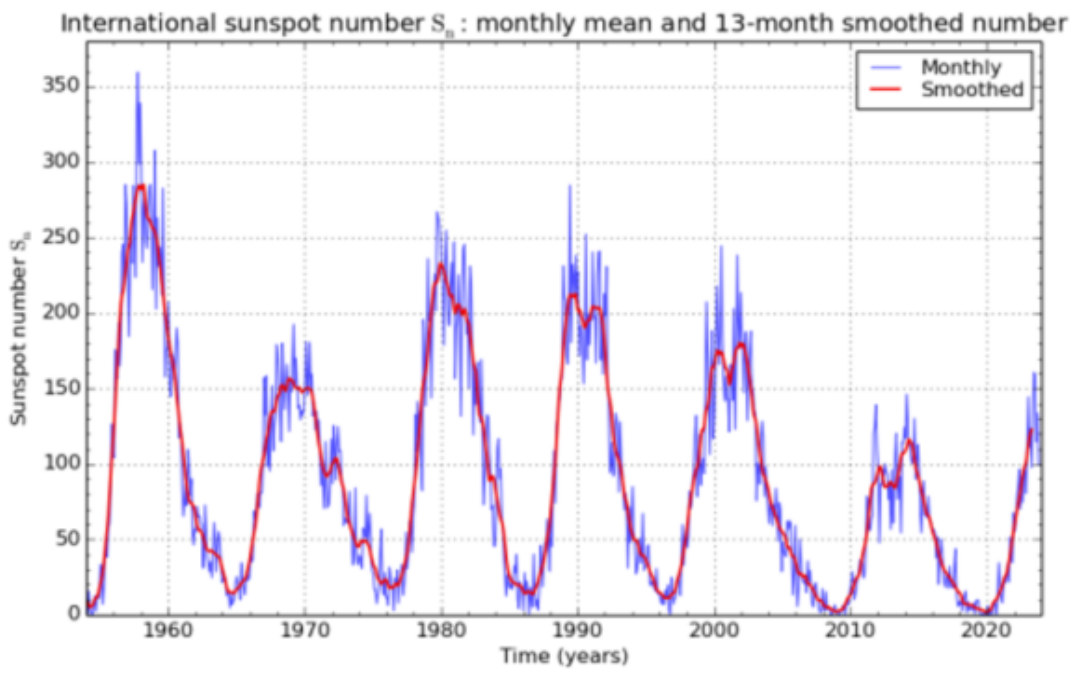
Newton ????????

?????????????????Bucha??



???V. Bucha, Annales Geophysicae, Vol.6, 513-524 (1988)

????SIDC?????????????????????cycle20?1964-1976??cycle24,25?2008-????????????????????

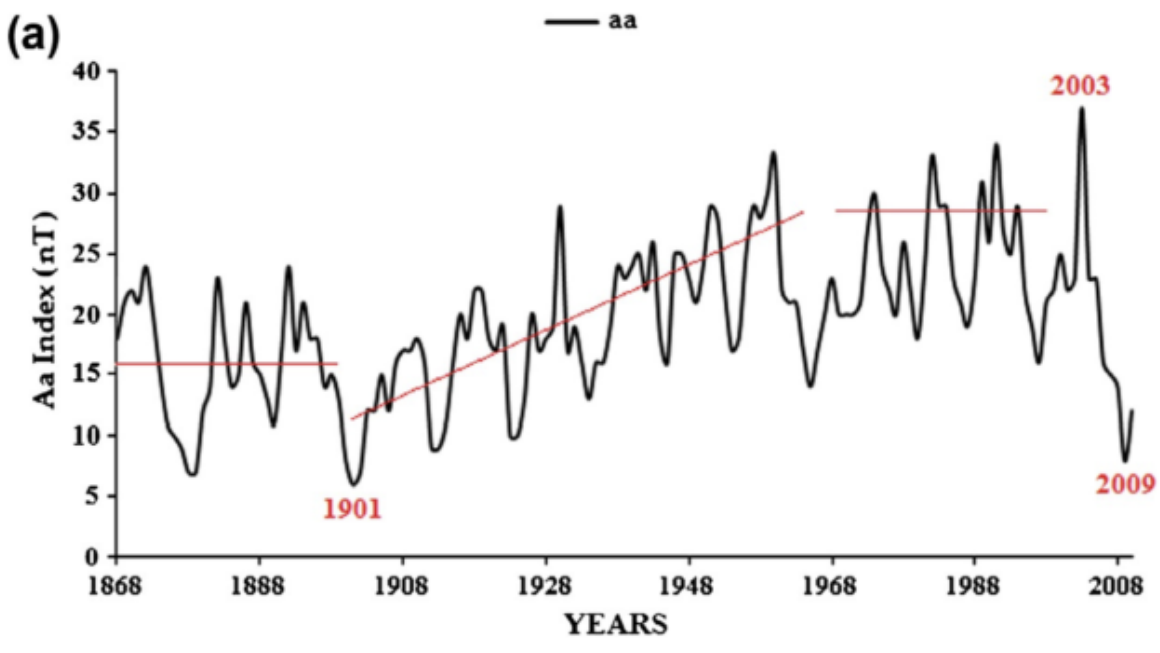


SILSO graphics (<http://sidc.be/silso>) Royal Observatory of Belgium 2023 November 1

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 science??44??????
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- 2006??18???
- 1963??38???
- 1918?????
- 1877??????????25cm???
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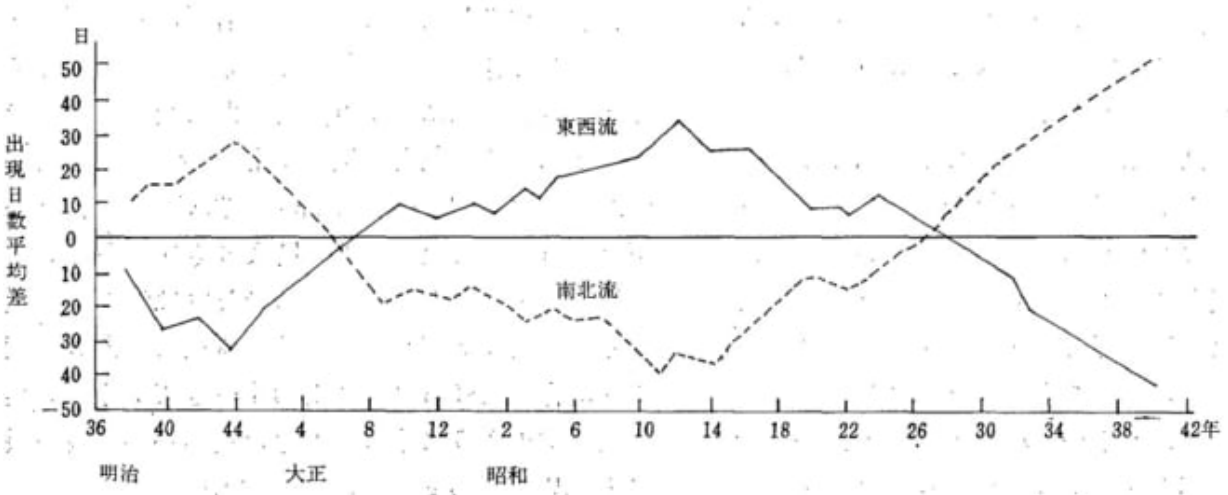


??????Zebro, J-L et al., Journal of Adavanced Research (2013),4, 265-274

1300?1918?	???	???????????
1919?1962?	??????	???????????
1963?1976?	??????	???????????
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1963?	38?????????????
1964?	????????????????????
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1971?	1????????3????????100??
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1973?	?????????????
1973?	????????????????????????????????250????????????????????????????????9?????

????????????????cycle20????????????38????????????????????cycle24,25????????????????18????????????
 ?????

IPCC????????1988????1977-2005????????????????????????????????????2000???Independent???CO2?
 ?????????????????????????

????????????????2006??2005/12-2006/2????????18????????????????????????????????
??2009????????????????????????

2006?? ?????18????????????

2010?? ????????

2010?? ?????????????????????????????????

2012?? ??????????????

2013?? ?????

2014?? ????????????

2014?? ?????????????????????????????

2015?? ????????????

2016? ?????

2017?? ?????????????

2017?? ?????????????????

2018?? ?????????????????

2019?? ????????????

2019??2020?? ?????????????????????

2021?? ?????????????????

2021?? ???

2022?1? ??????????50.7???

2022?? ?????????????????????????????????

2023?? ?????????????

2023?? ?????????????????????????????

4. ??

??????????1967,1975????CO2????????????R. Newell????????????????1979????????

CO₂????1979????????

???IPCC????????CO2??
???

??EV????EV????550????????1??CO2?
????????????????????

COP28????CO2??
??

?????? 1????? J-
POWER????????????BBC??
????????????????

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?1?

1985????????DOE????Lawrence Livermore????
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