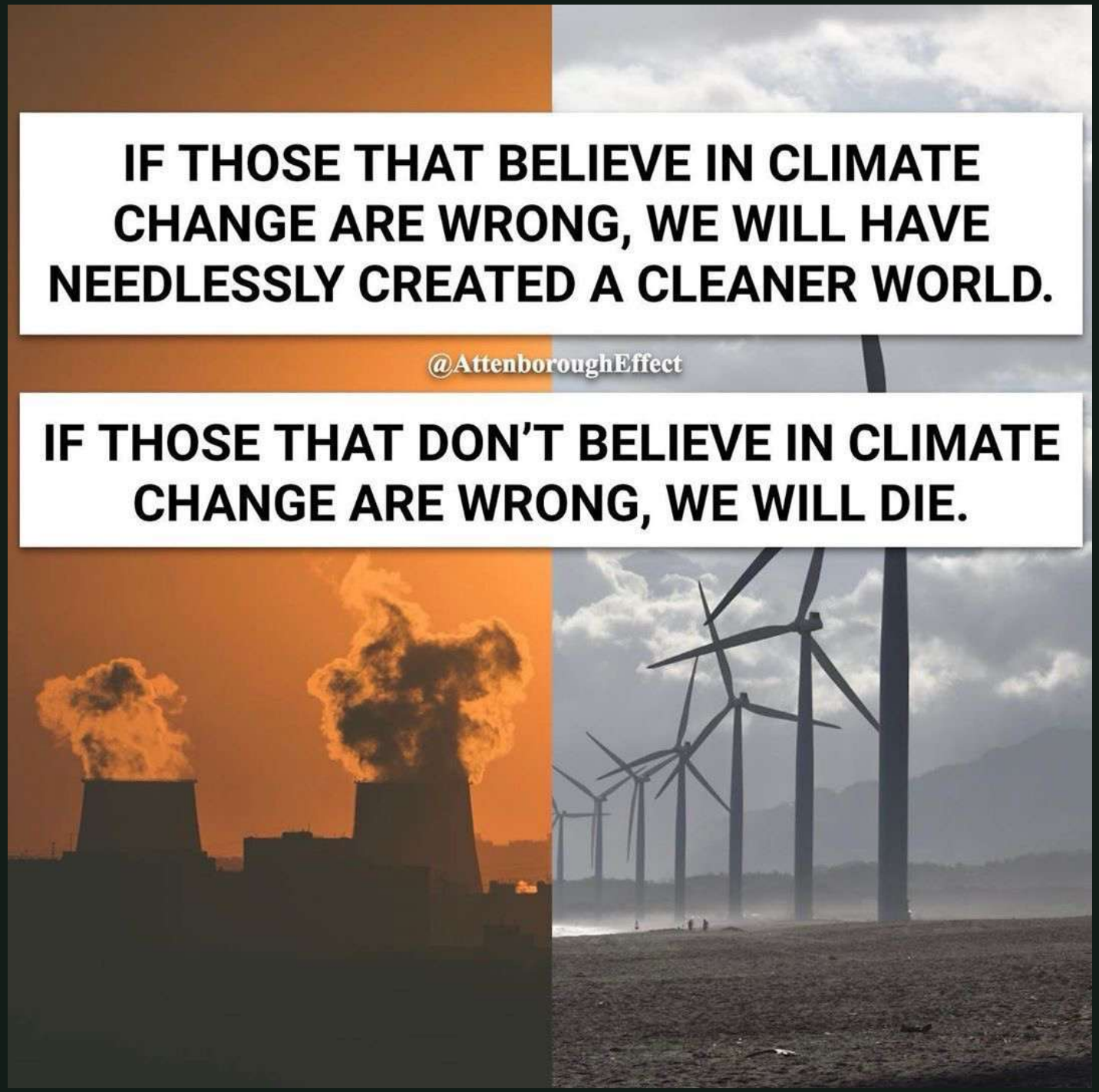
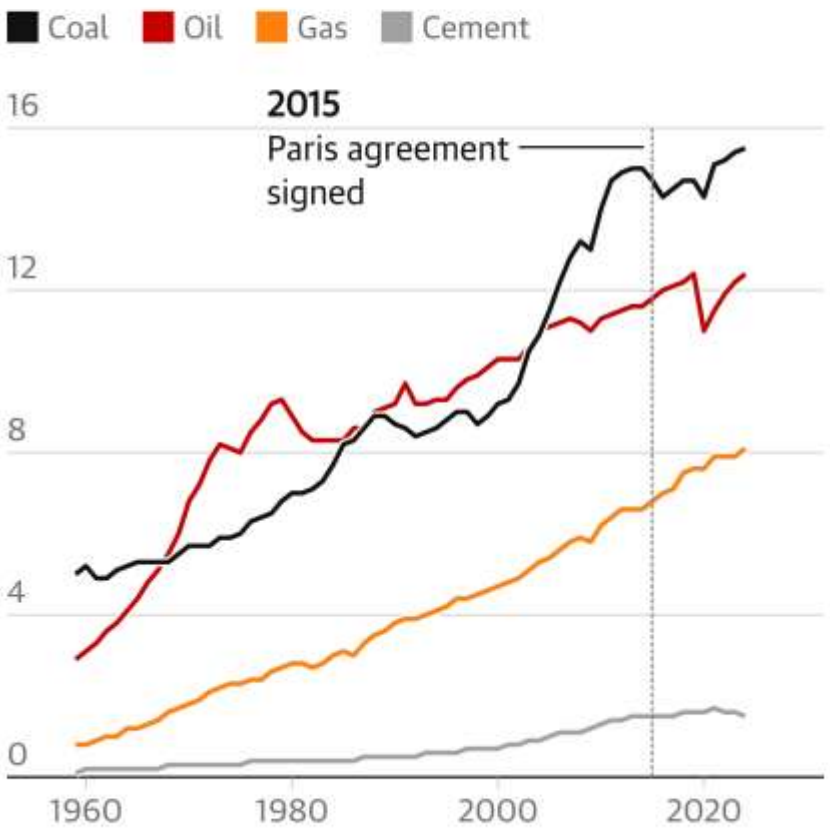
Sustainable Ferriby 2025

Order tea, coffee etc from the bar, make yourself comfortable, we begin at 9:30


IF THOSE THAT BELIEVE IN CLIMATE CHANGE ARE WRONG, WE WILL HAVE NEEDLESSLY CREATED A CLEANER WORLD.
@AttenboroughEffect
IF THOSE THAT DON'T BELIEVE IN CLIMATE CHANGE ARE WRONG, WE WILL DIE.

Fossil fuel emissions projected to be almost 8% higher in 2024 than in 2015, the year the Paris climate agreement was signed

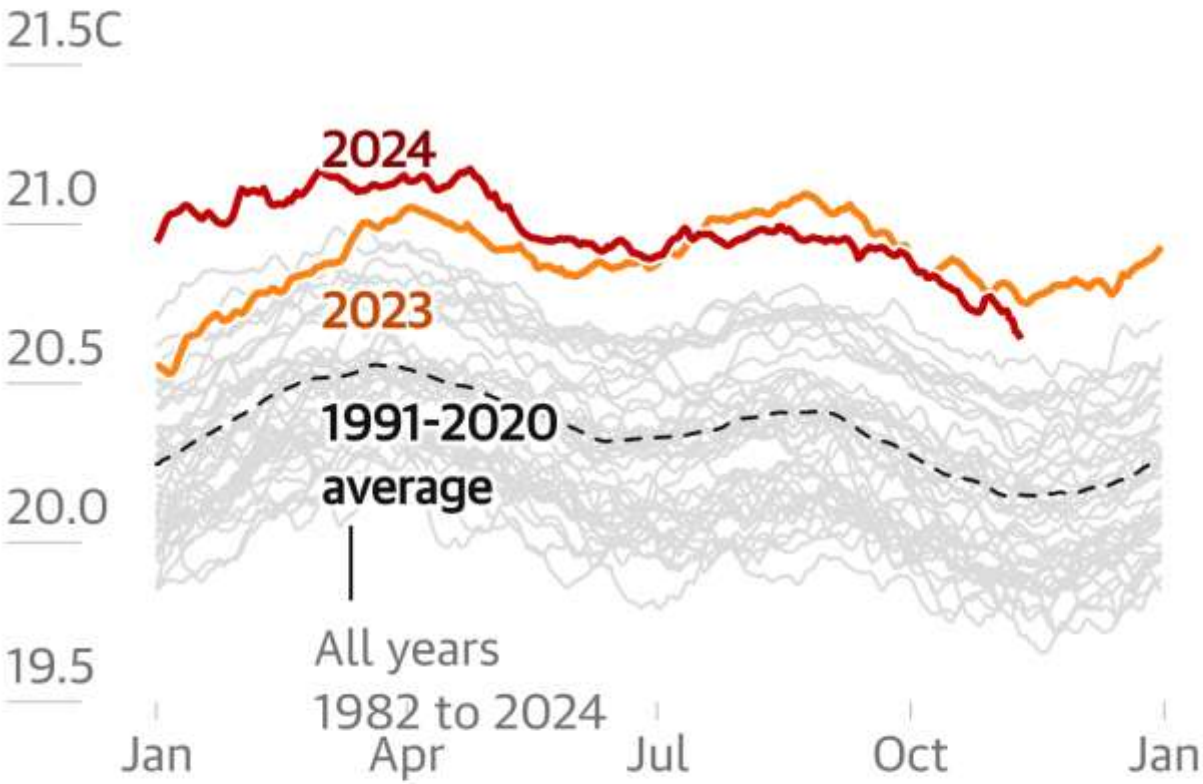
Annual global CO_2 emissions from fossil fuels, gigatonnes



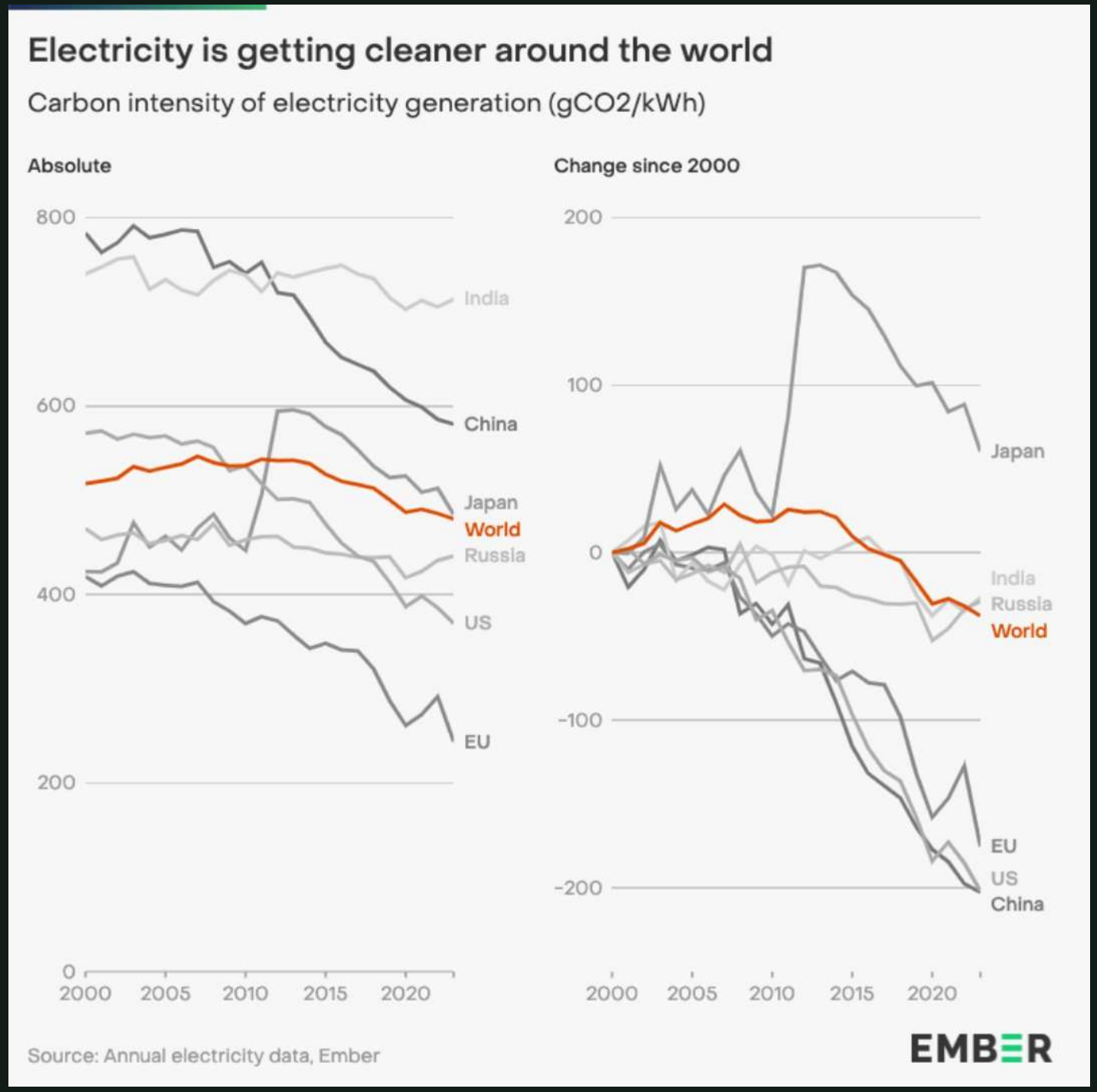
Guardian graphic. Source: Global Carbon Budget, Friedlingstein et al. Earth System Science Data, 2024

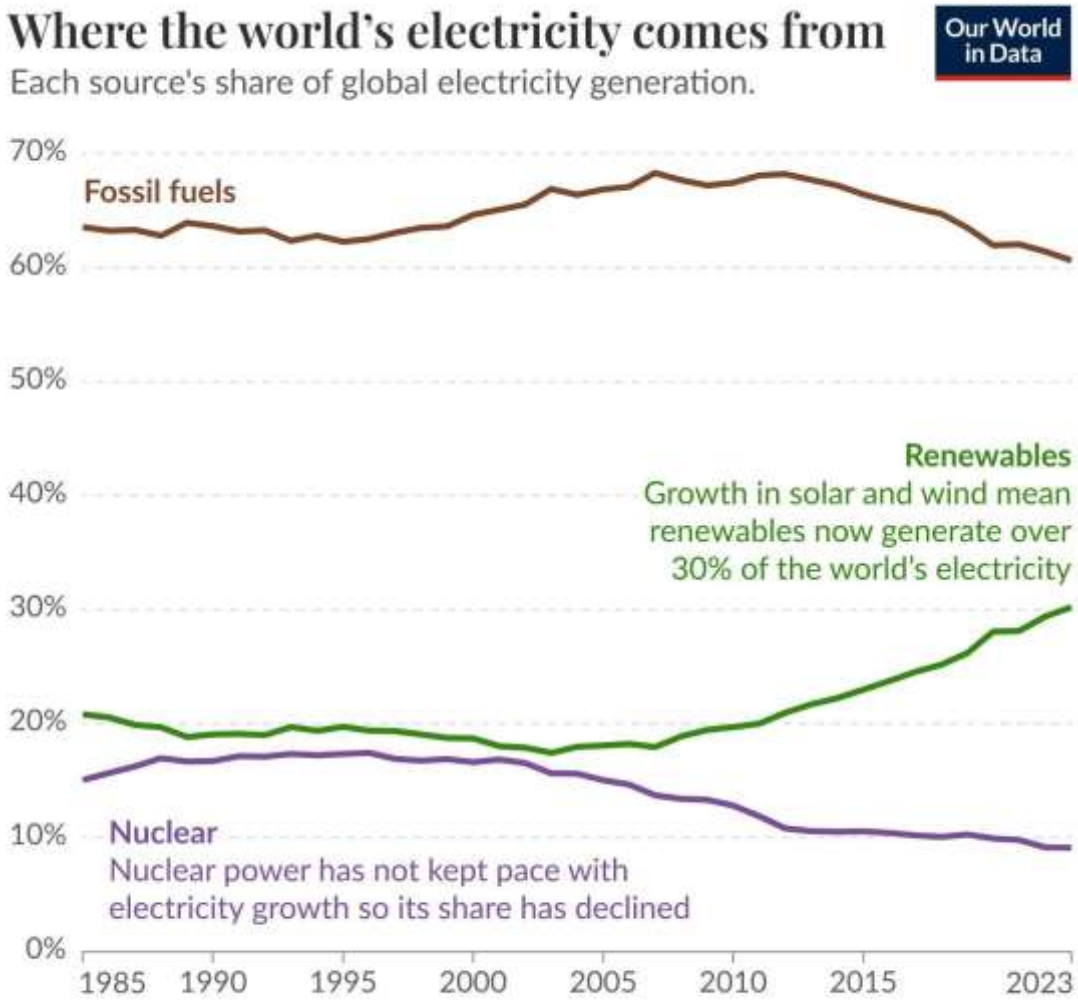
Ocean surface temperatures broke records in the first half of 2024

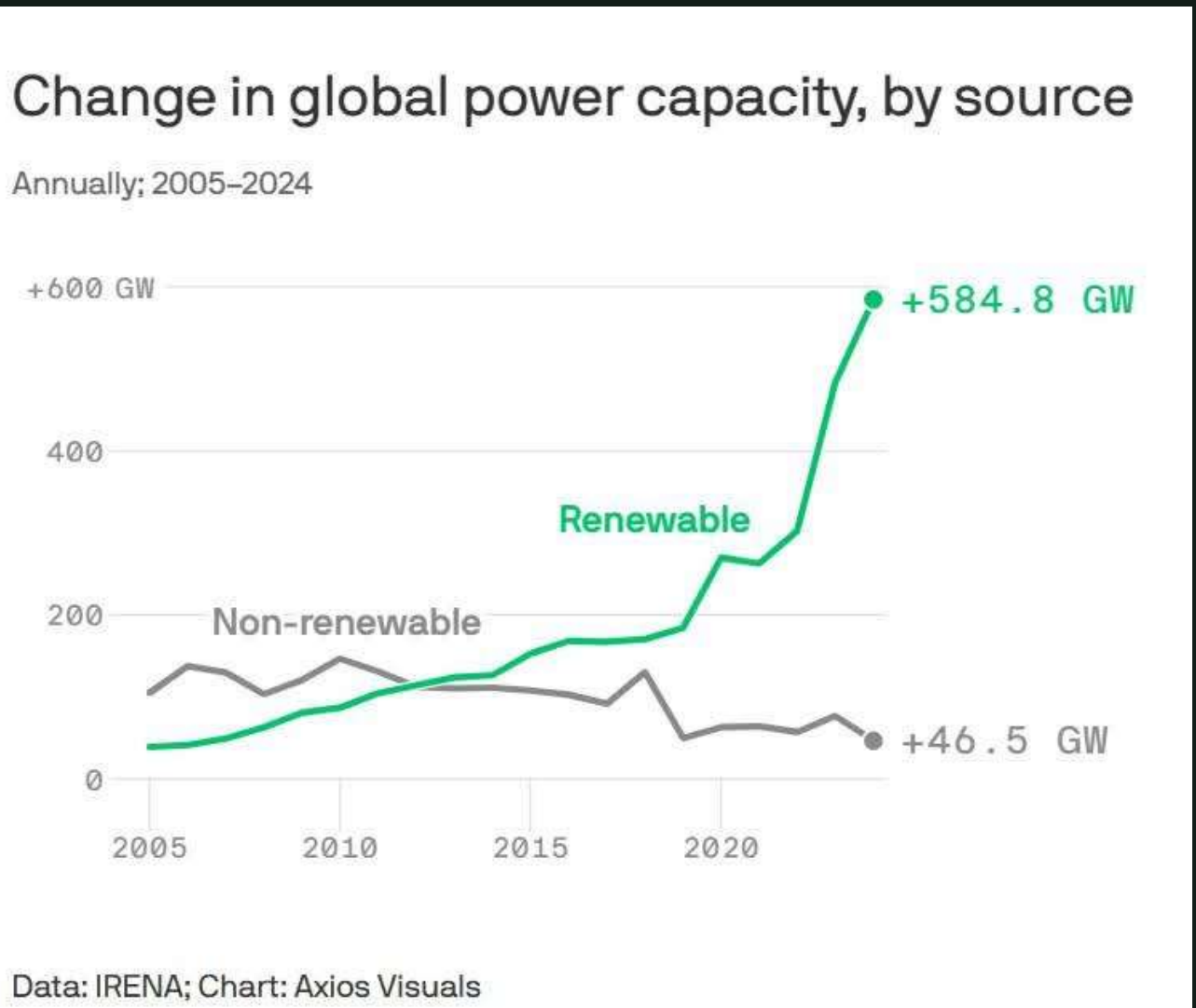
Average daily sea surface temperature, C



Guardian graphic. Source: Noaa, Maine Climate Office, Climate Change Institute, University of Maine. Note: data covers oceans from 60 degrees north to 60 degrees south of the equator

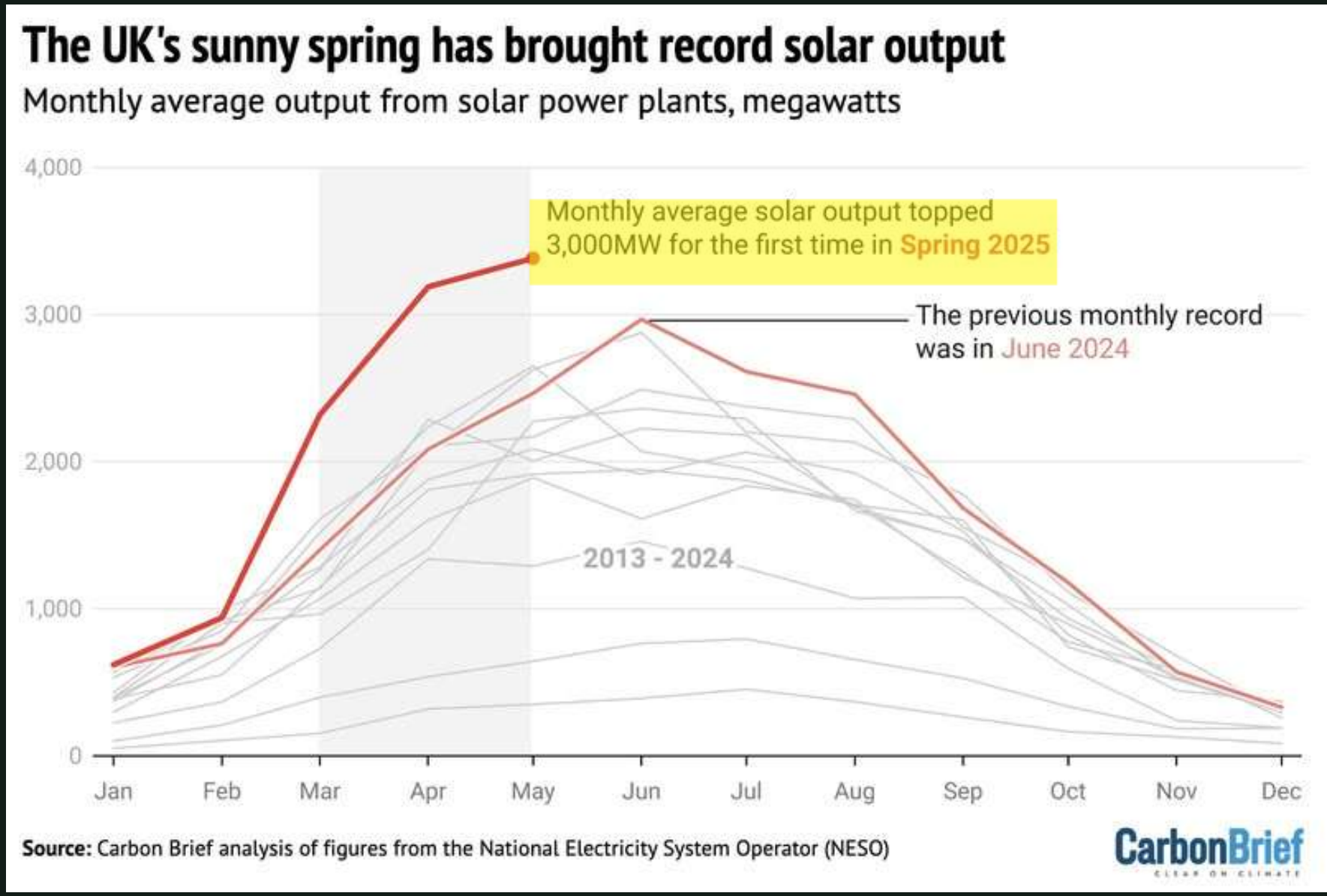

Electricity is getting cleaner around the world
Carbon intensity of electricity generation (gCO2/kWh)
Absolute
800
600
400
200
0
2000
2005
2010
2015
2020
India
China
Japan
World
Russia
US
EU
Change since 2000
200
100
0
-100
-200
2000
2005
2010
2015
2020
Japan
India
Russia
World
EU
US
China
Source: Annual electricity data, Ember
EMBER

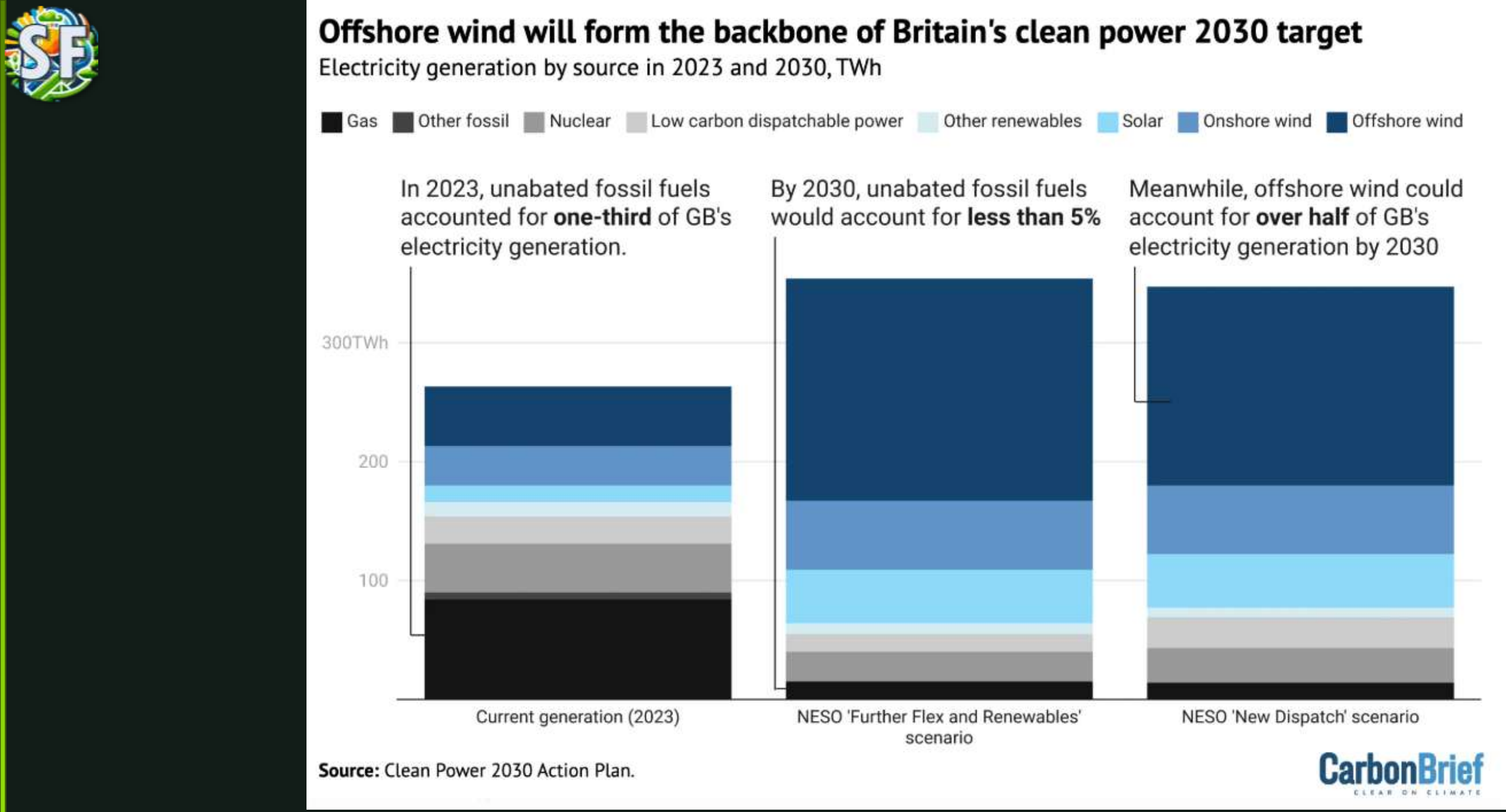

Where the world's electricity comes from
Each source's share of global electricity generation.
Our World in Data
70%
60%
50%
40%
30%
20%
10%
0%
Fossil fuels
Renewables
Growth in solar and wind mean renewables now generate over 30% of the world's electricity
Nuclear
Nuclear power has not kept pace with electricity growth so its share has declined
1985
1990
1995
2000
2005
2010
2015
2023
Data source: Ember; EI - Statistical Review of World Energy (2024)
CC BY


Change in global power capacity, by source
Annually; 2005–2024
+600 GW
400
200
0
+584.8 GW
Renewable
Non-renewable
+46.5 GW
2005
2010
2015
2020
Data: IRENA; Chart: Axios Visuals

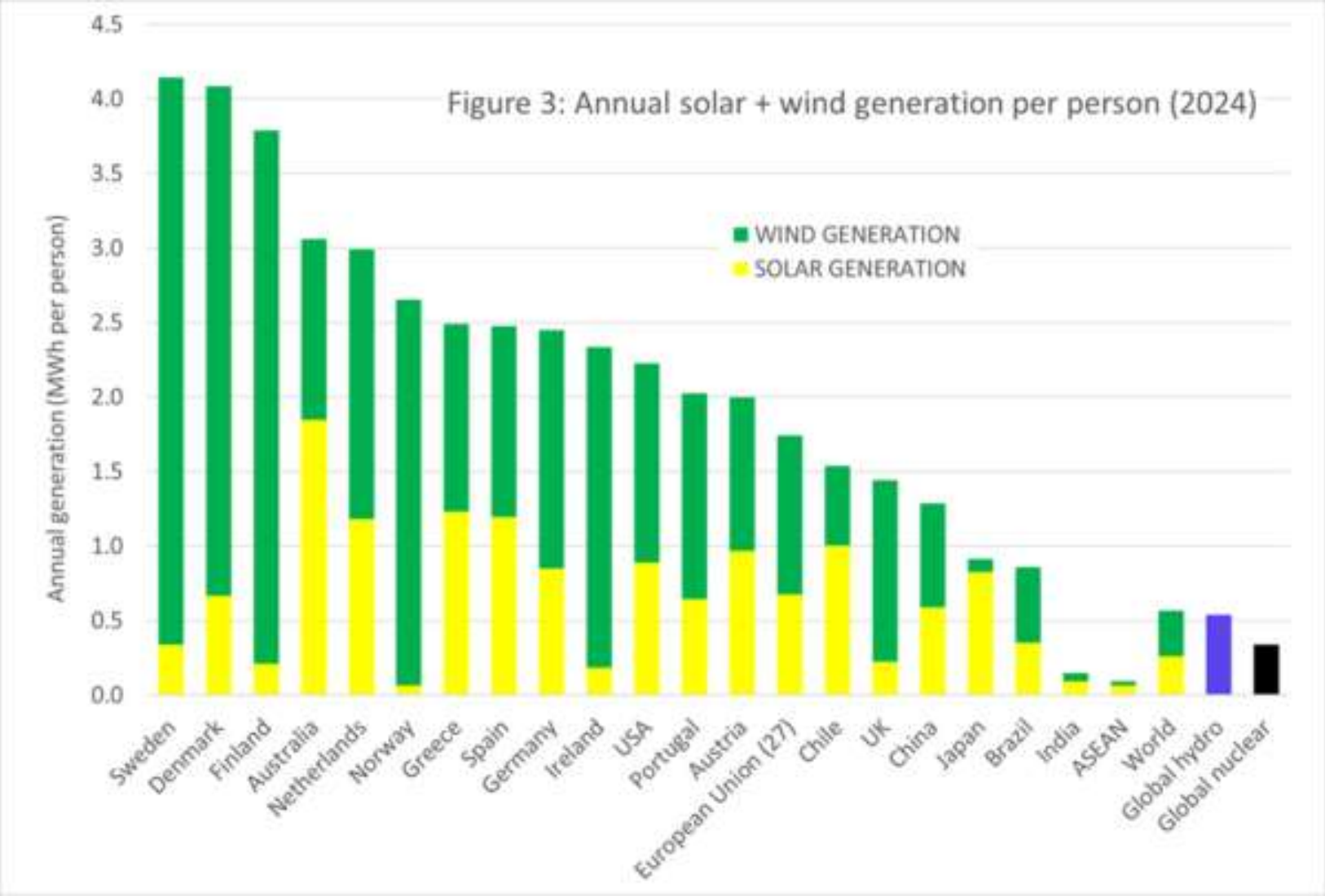
Solar electricity generated to date in 2025 has avoided the need to import gas costing us ~£600m

and would have released 6 million tonnes of CO_2 when burned.




Offshore wind will form the backbone of Britain's clean power 2030 target
Electricity generation by source in 2023 and 2030, TWh
Gas
Other fossil
Nuclear
Low carbon dispatchable power
Other renewables
Solar
Onshore wind
Offshore wind
In 2023, unabated fossil fuels accounted for one-third of GB's electricity generation.
By 2030, unabated fossil fuels would account for less than 5%
Meanwhile, offshore wind could account for over half of GB's electricity generation by 2030
300TWh
200
100
Current generation (2023)
NESO 'Further Flex and Renewables' scenario
NESO 'New Dispatch' scenario
Source: Clean Power 2030 Action Plan.
CarbonBrief
CLEAR ON CLIMATE

Leading countries for solar and wind generation



- Per capita:
  - Sweden
  - Denmark
  - Finland
  - Netherlands
  - Norway
  - Greece
- UK
  - 16th for solar + wind per capita
  - **6th for installed wind (30.2 GW)**

Renewables are cheapest

£42/MWh

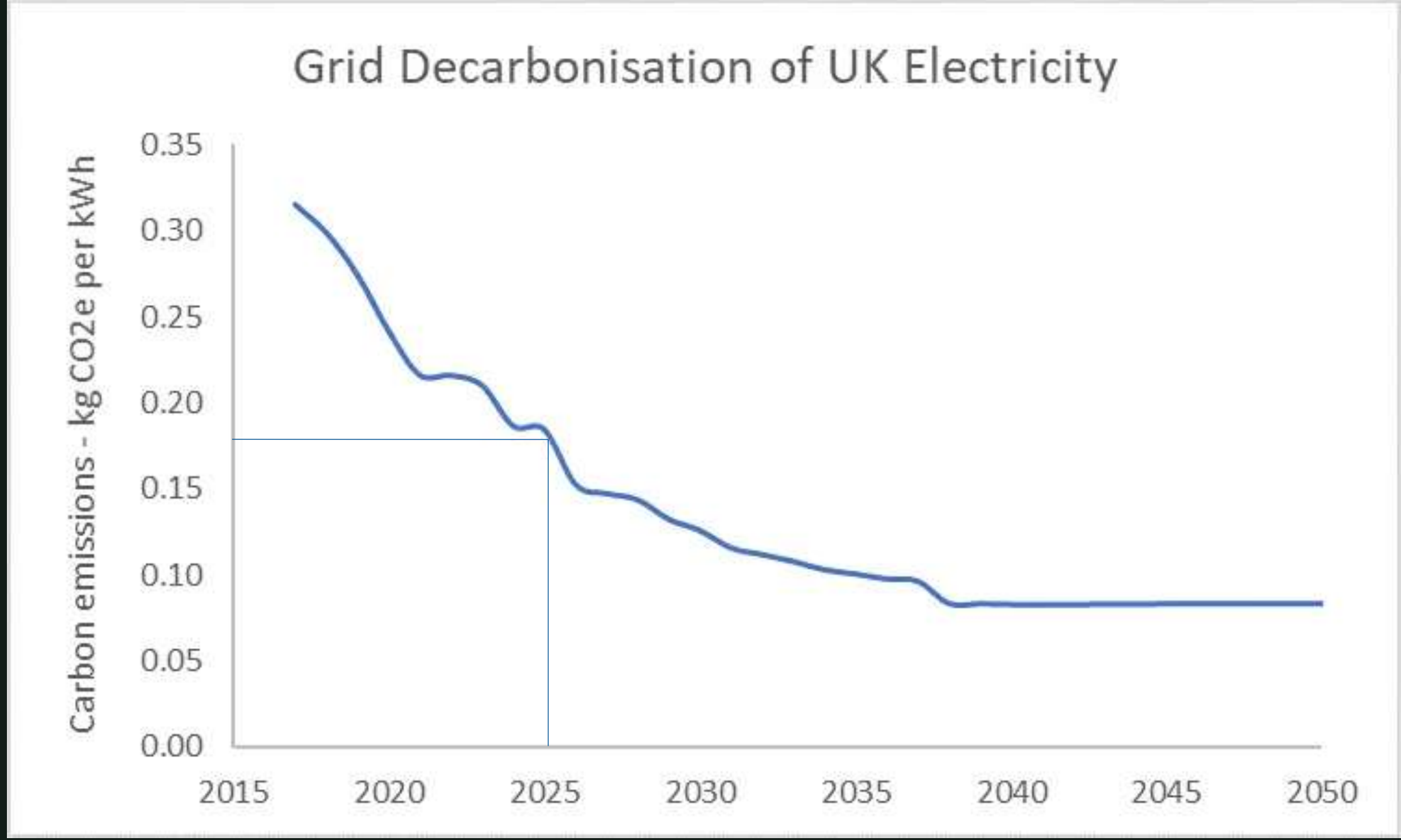
Onshore Wind

£57/MWh

Offshore Wind

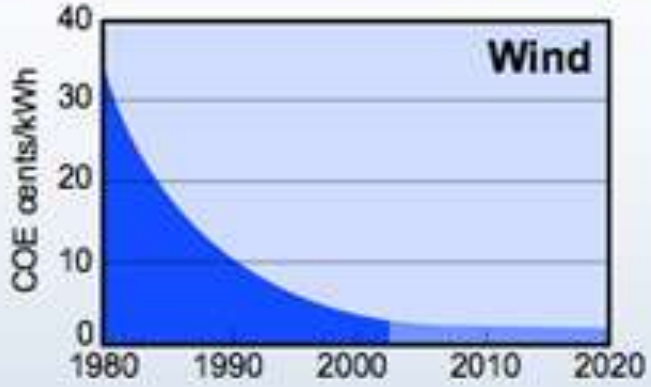
£84/MWh

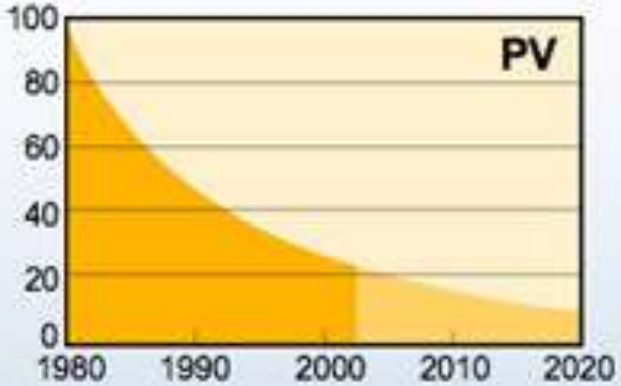
Nuclear

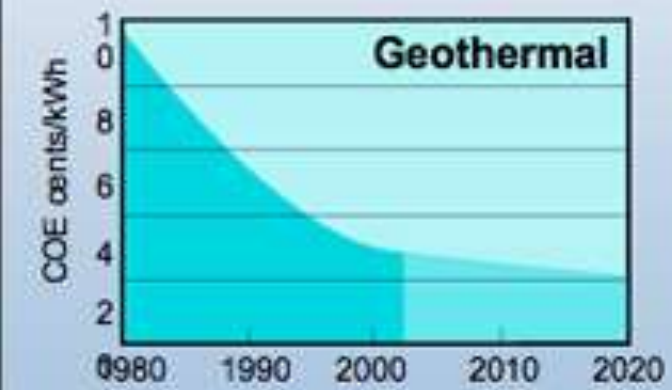

Grid Decarbonisation of UK Electricity
Carbon emissions - kg CO2e per kWh
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
2015
2020
2025
2030
2035
2040
2045
2050

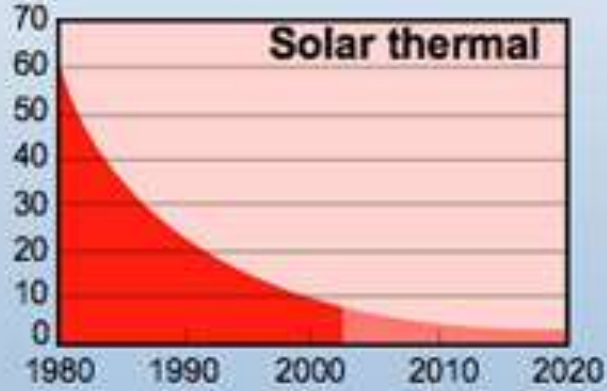
Renewable Energy Cost Trends

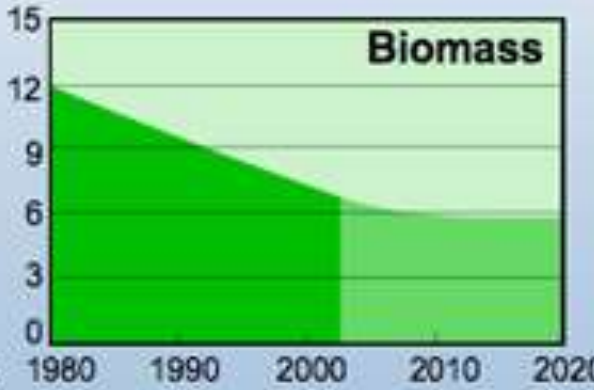
Levelized cents/kWh in constant $2000[1]







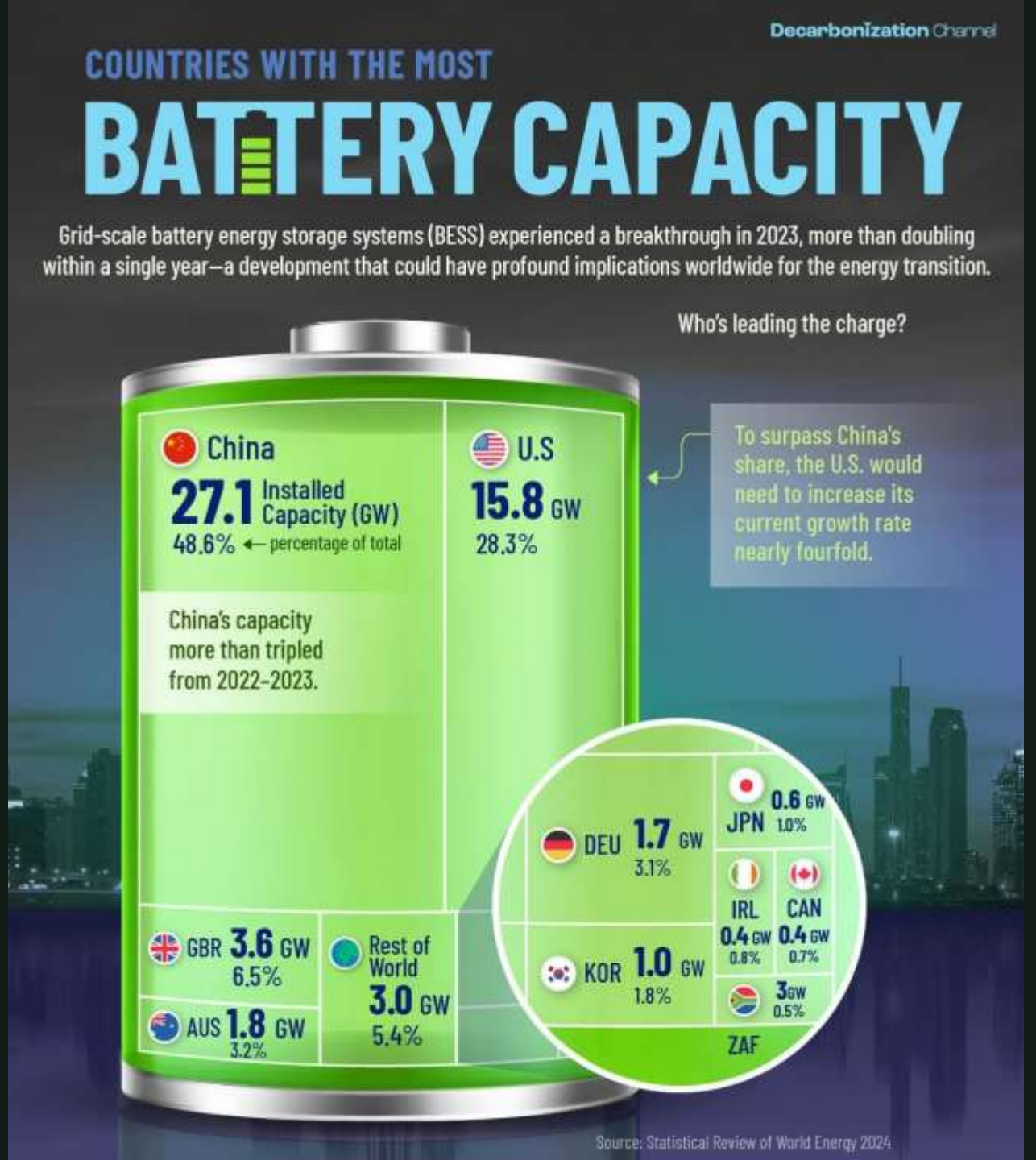




Source: NREL Energy Analysis Office (www.nrel.gov/analysis/docs/cost_curves_2002.ppt)
[1]These graphs are reflections of historical cost trends NOT precise annual historical data.
Updated: October 2002

EAO Energy Analysis Office
Understanding Energy Issues

NREL National Renewable Energy Laboratory


Decarbonization Channel
COUNTRIES WITH THE MOST
BATTERY CAPACITY
Grid-scale battery energy storage systems (BESS) experienced a breakthrough in 2023, more than doubling within a single year—a development that could have profound implications worldwide for the energy transition.
Who's leading the charge?
China
27.1 Installed Capacity (GW)
48.6% ← percentage of total
China's capacity more than tripled from 2022–2023.
U.S
15.8 GW
28.3%
To surpass China's share, the U.S. would need to increase its current growth rate nearly fourfold.
GBR 3.6 GW 6.5%
AUS 1.8 GW 3.2%
Rest of World 3.0 GW 5.4%
DEU 1.7 GW 3.1%
KOR 1.0 GW 1.8%
JPN 0.6 GW 1.0%
IRL 0.4 GW 0.8%
CAN 0.4 GW 0.7%
3GW 0.5%
ZAF
Source: Statistical Review of World Energy 2024

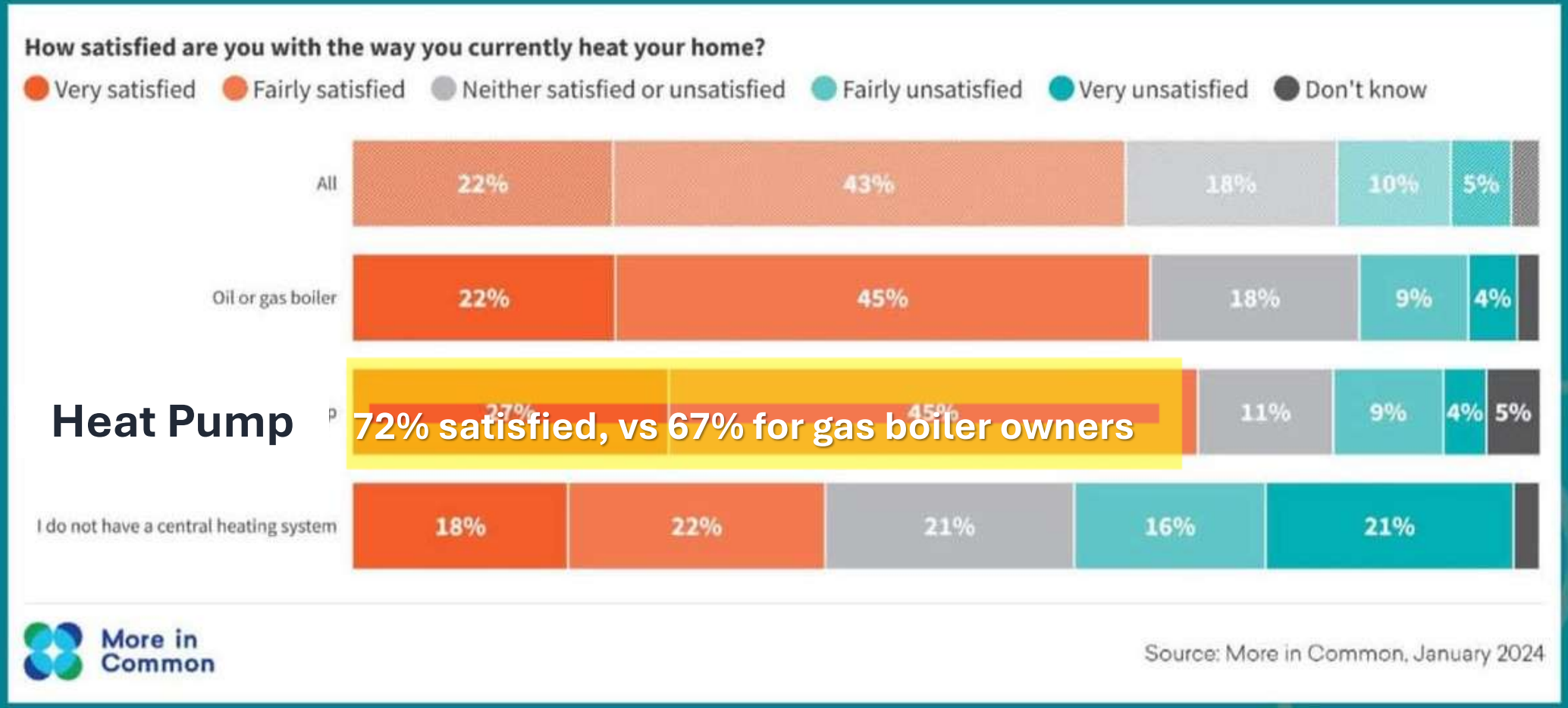
Welcome to

Sustainable Ferriby 2025

Order tea, coffee etc from the bar, make yourself comfortable, we begin at 9:30

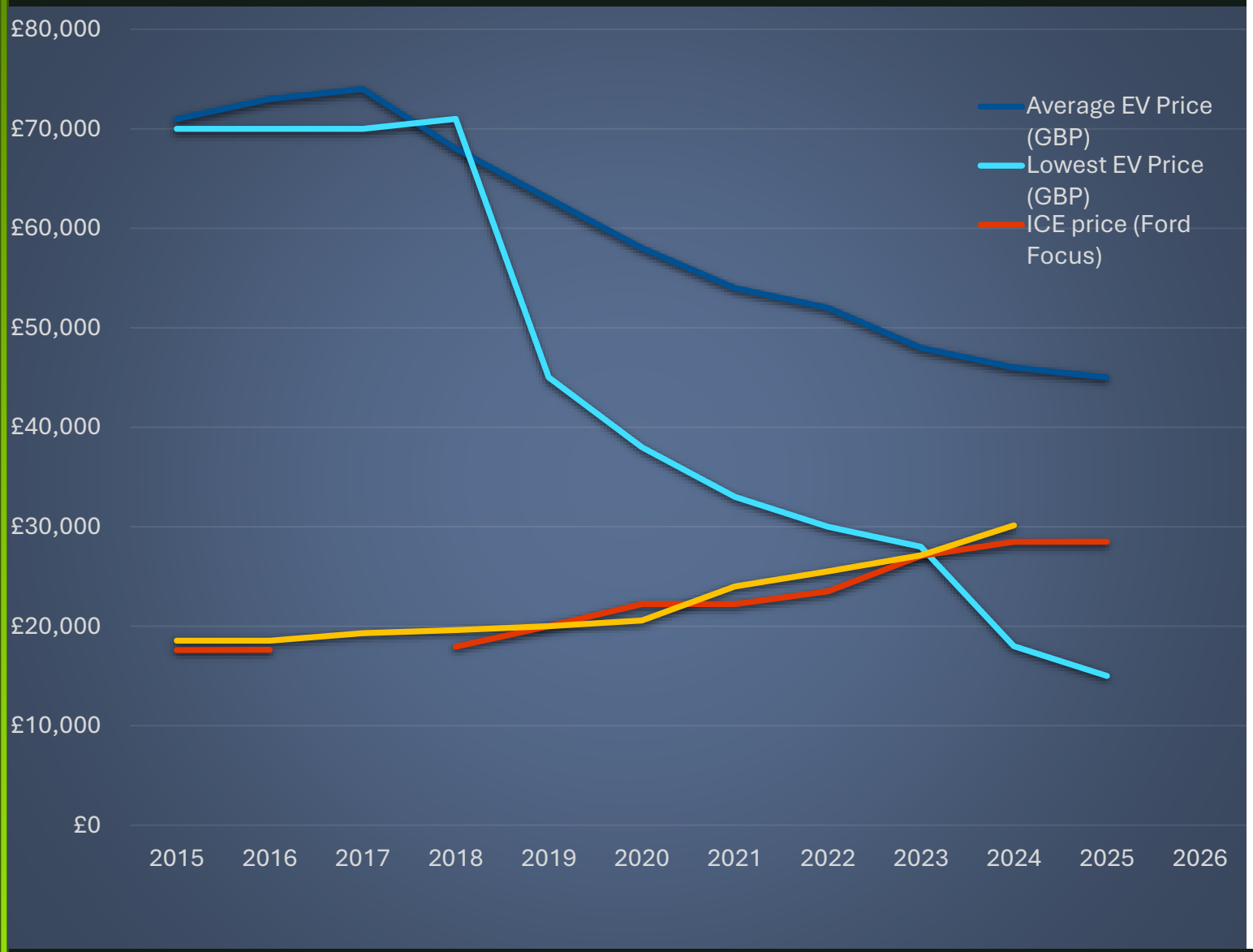
Heat Pump satisfaction

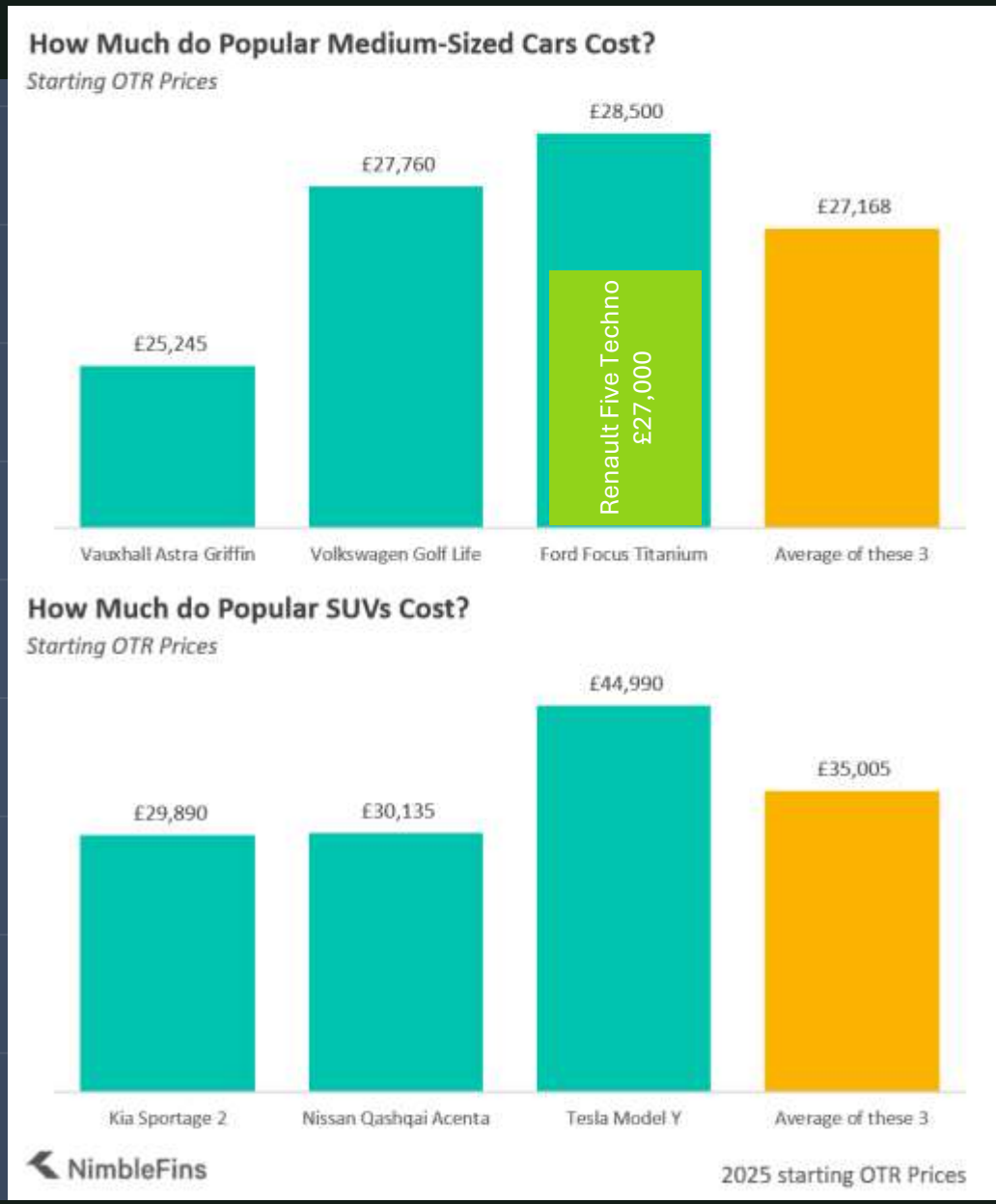
02 People with a heat pump are happy with their choice – and more so than those with gas boilers...




Welcome to
Sustainable Ferriby
2025
Order tea, coffee etc from the bar, make yourself comfortable, we begin at 9:30

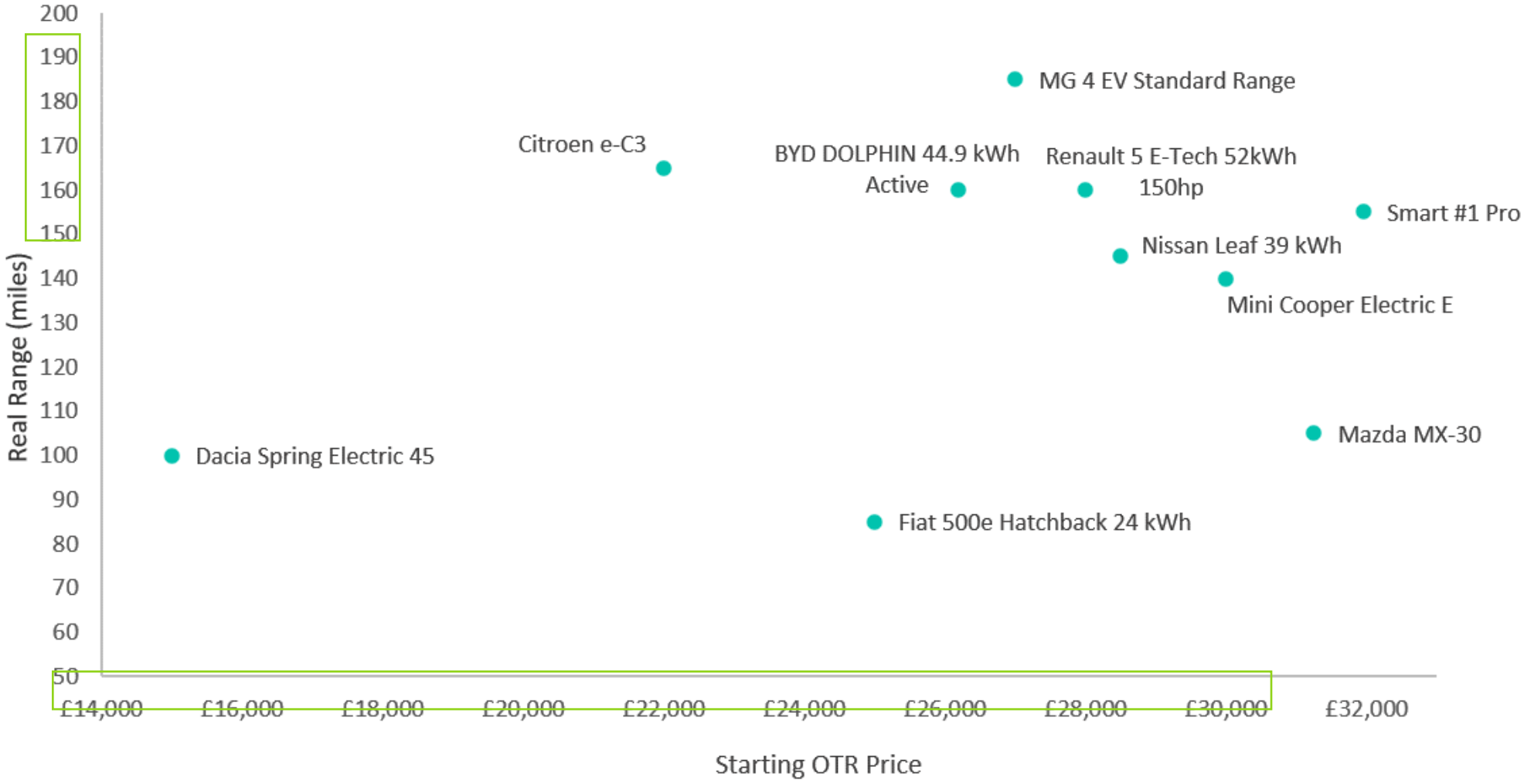
Cost of EVs are falling





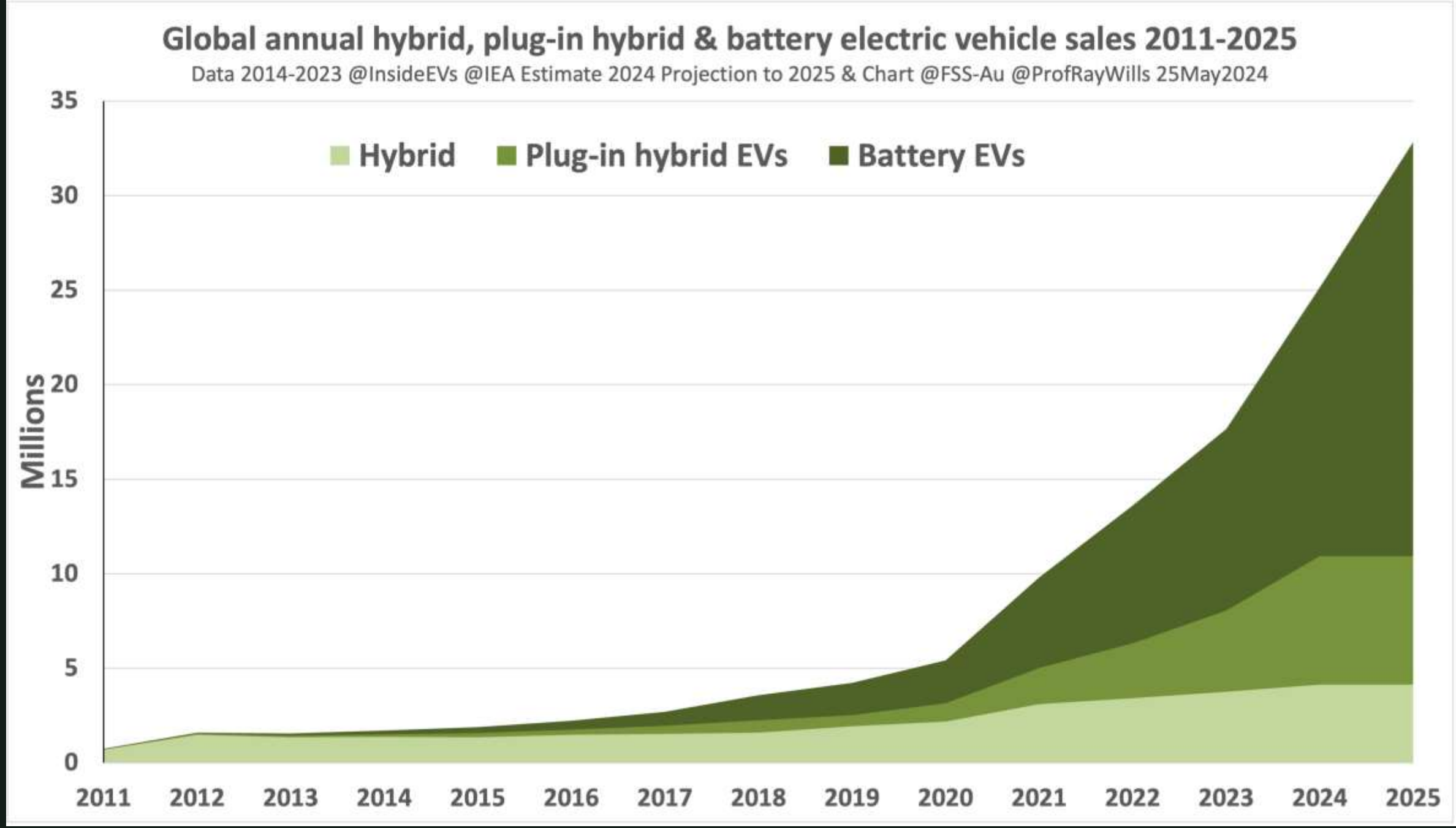
https://www.nimblefins.co.uk/cheap-car-insurance/average-cost-cars-uk

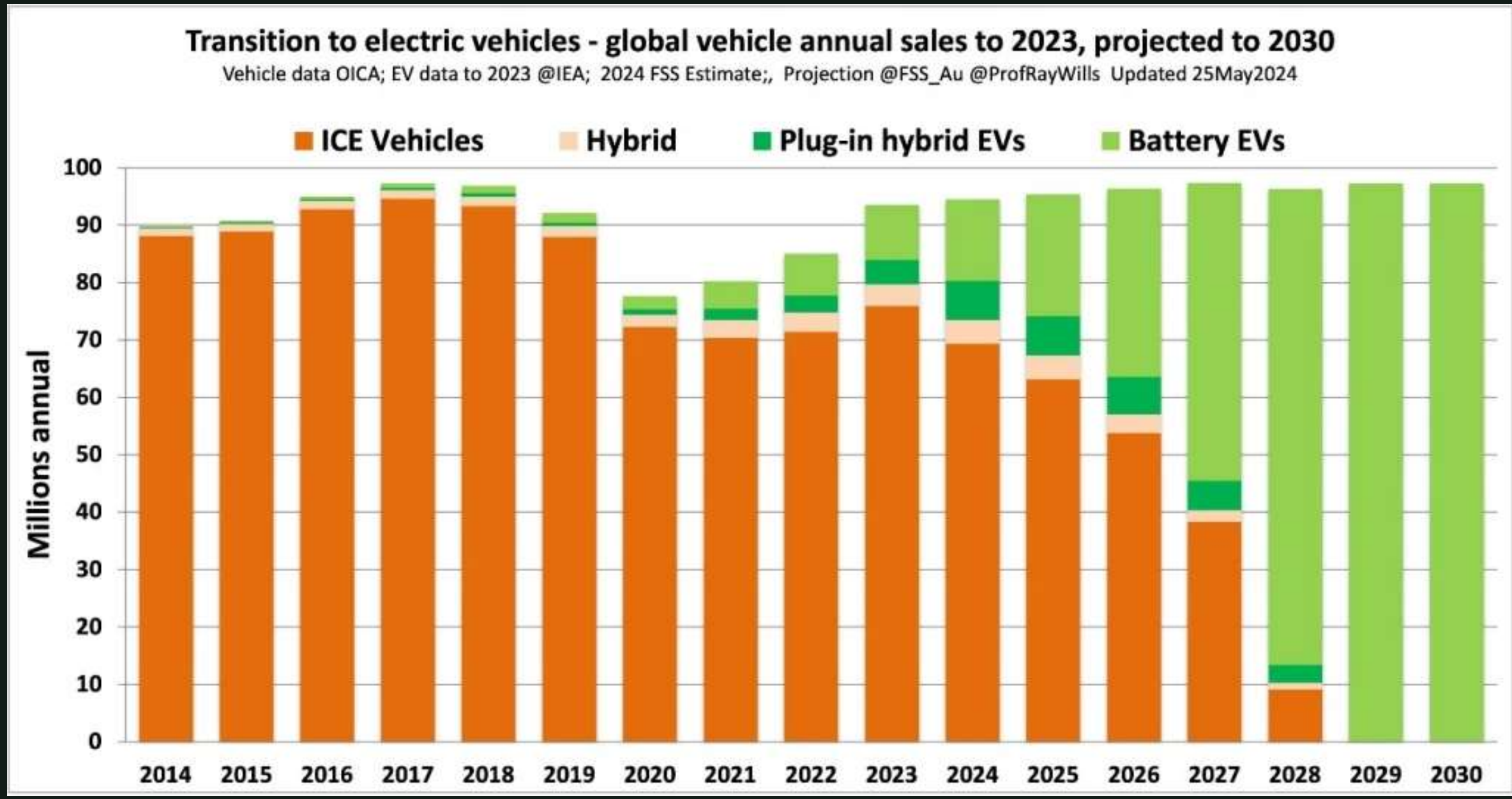
Comparing Prices and Ranges of Cheapest UK Electric Car Brands



NimbleFins

Average range reflects combined city and motorway driving in both summer and winter. NimbleFins' analysis of data from the EV Database. Each model is the cheapest electric car for each represented car brand.


Global annual hybrid, plug-in hybrid & battery electric vehicle sales 2011-2025
Data 2014-2023 @InsideEVs @IEA Estimate 2024 Projection to 2025 & Chart @FSS-Au @ProfRayWills 25May2024
Hybrid
Plug-in hybrid EVs
Battery EVs
Millions
35
30
25
20
15
10
5
0
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025


Transition to electric vehicles - global vehicle annual sales to 2023, projected to 2030
Vehicle data OICA; EV data to 2023 @IEA; 2024 FSS Estimate;, Projection @FSS_Au @ProfRayWills Updated 25May2024
ICE Vehicles
Hybrid
Plug-in hybrid EVs
Battery EVs
Millions annual
100
90
80
70
60
50
40
30
20
10
0
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030

CAR FIRES BY VEHICLE TYPE

Rank and Fuel Type	Fires (per 100k Sales)	Total Fires
1 Hybrid	3,474.5	16,051
2 Gas	1,529.9	199,533
3 Electric	25.1	52

Likelihood of car fire

- Petrol/Diesel = **0.1%**
- EV = **0.0012%**

A petrol car is **~83 times** more likely to catch fire than an electric car

https://energysavingtrust.org.uk/report/are-electric-vehicles-a-fire-risk/

France Tops European Leaderboard for 2024 EV Charger Installs

Top 10 markets in Europe by cumulative public charging connectors

Country	Size of network at end of 3Q 2024	Additions across 1Q-3Q 2024
Netherlands	170,964	26,311
Germany	141,563	19,400
France	**136,841**	**27,804**
UK	81,893	7,879
Belgium	67,589	23,047
Italy	58,949	12,522
Sweden	47,921	9,947
Spain	37,027	4,492
Denmark	32,274	9,092
Austria	29,838	7,314

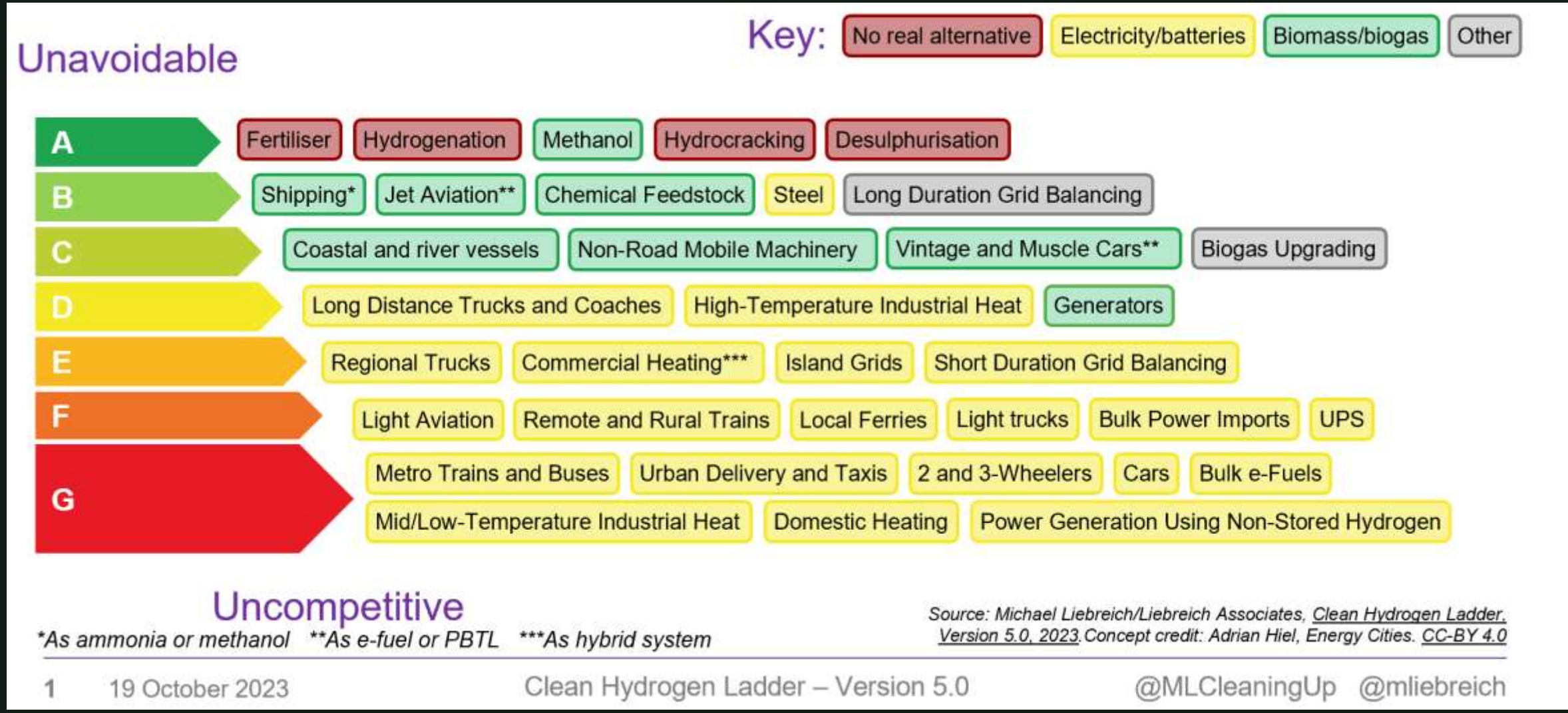
Source: BloombergNEF, Eco-Movement.
Note: Counts uniquely useable connectors by market. Excludes CHAdeMO connector type.

BloombergNEF

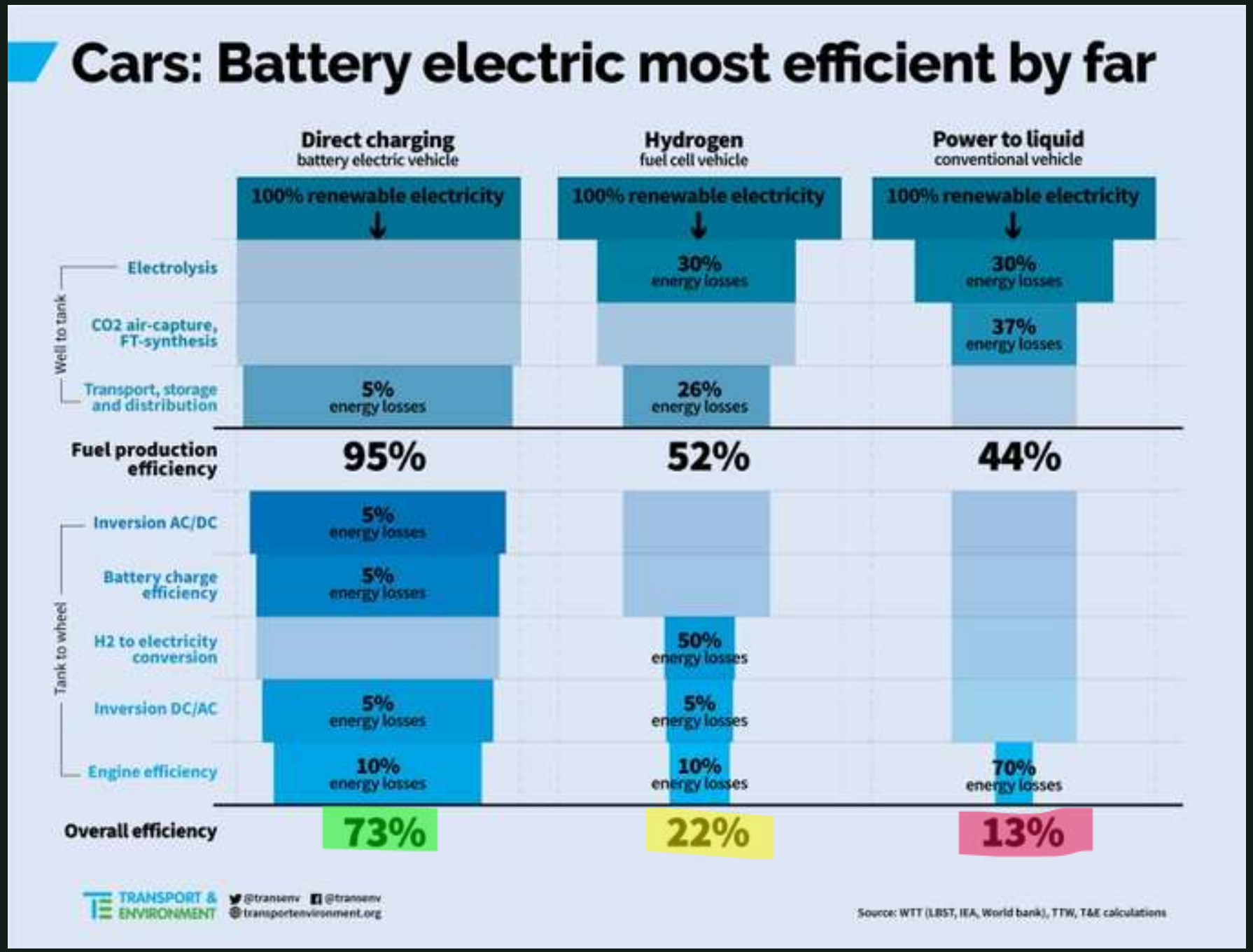
UK has over **150 thousand places** for EVs to charge

- 115,241 public connectors
  - 39,733 locations
  - 1,344 added last month
- 33,000 workplace chargers
- 9,200 shared home chargers

Hydrogen Ladder



Far too valuable to use for cars or heating.

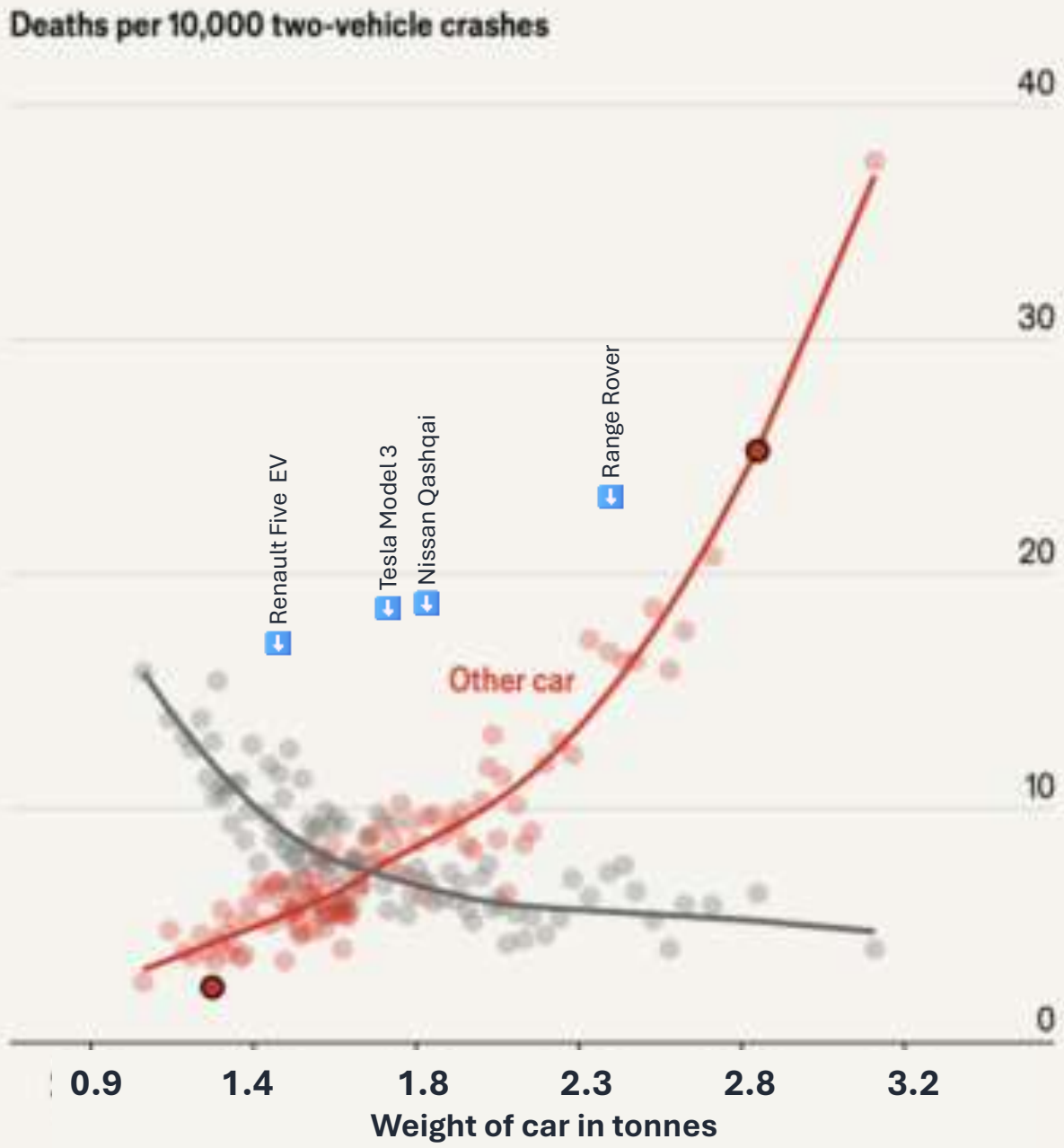

Cars: Battery electric most efficient by far
Direct charging
battery electric vehicle
Hydrogen
fuel cell vehicle
Power to liquid
conventional vehicle
100% renewable electricity
100% renewable electricity
100% renewable electricity
Well to tank
Electrolysis
30% energy losses
30% energy losses
CO2 air-capture, FT-synthesis
37% energy losses
Transport, storage and distribution
5% energy losses
26% energy losses
Fuel production efficiency
95%
52%
44%
Tank to wheel
Inversion AC/DC
5% energy losses
Battery charge efficiency
5% energy losses
H2 to electricity conversion
50% energy losses
Inversion DC/AC
5% energy losses
5% energy losses
Engine efficiency
10% energy losses
10% energy losses
70% energy losses
Overall efficiency
73%
22%
13%
TRANSPORT & ENVIRONMENT
@transenv
@transenv
transportenvironment.org
Source: WTT (LBST, IEA, World bank), TTW, T&E calculations

Heavy cars are more dangerous to other drivers

‘Partner-car deaths’ per 10,000 crashes:

- Heaviest vehicles: 37 deaths

  Median-weight cars: 5.7 deaths
- Lightest cars: 2.6 deaths



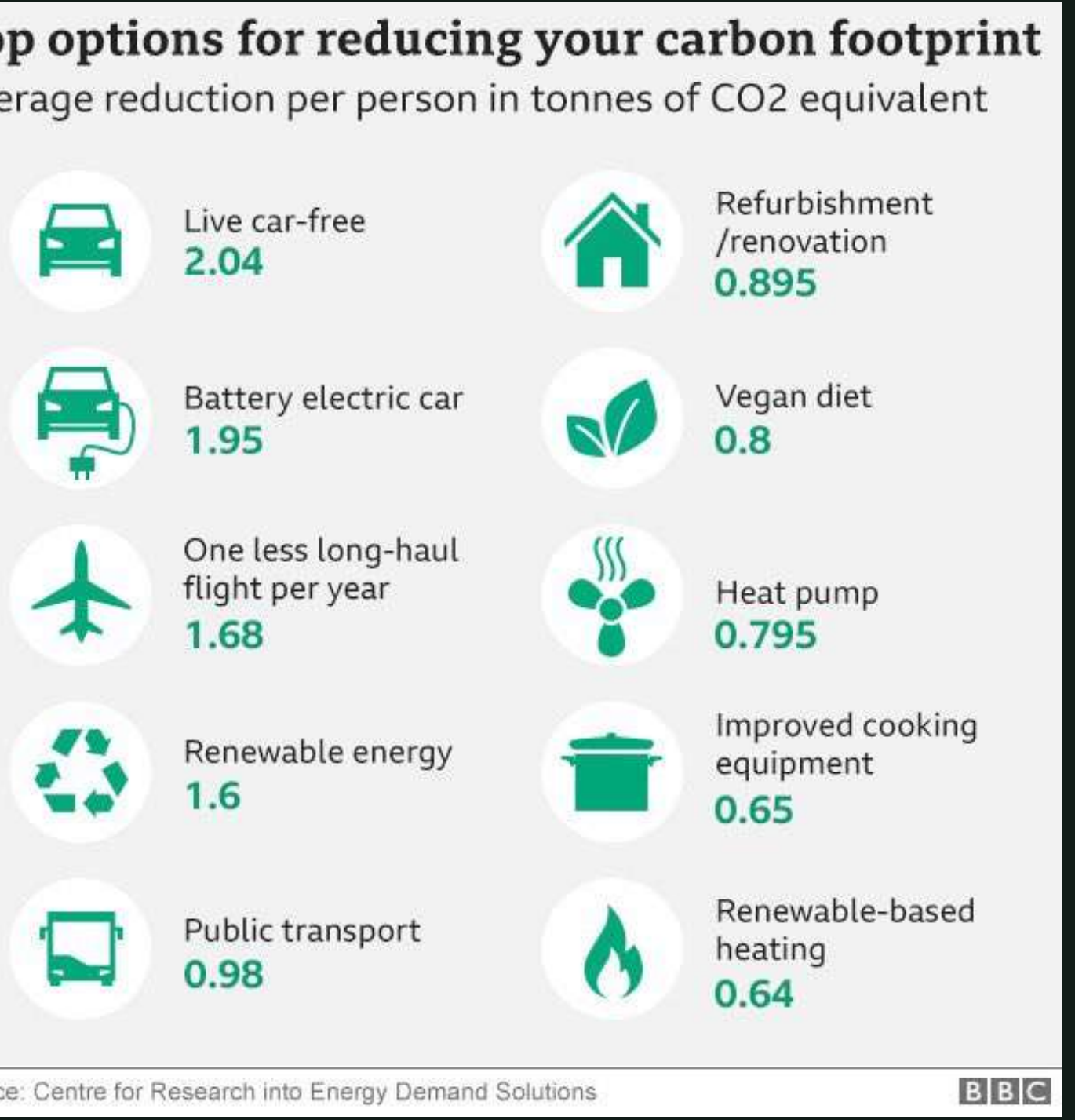
Welcome to

Sustainable Ferriby 2025

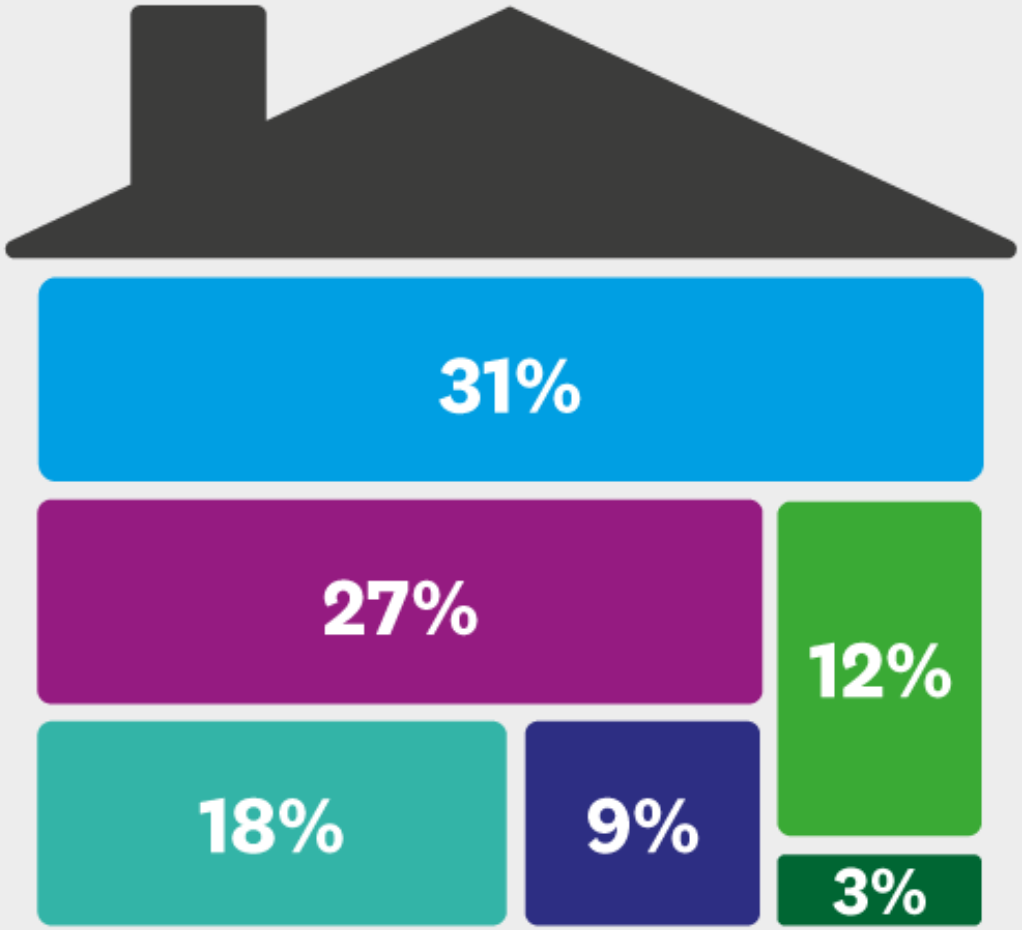
Order tea, coffee etc from the bar, make yourself comfortable, we begin at 9:30

Top options for reducing your carbon footprint

Average reduction per person in tonnes of CO2 equivalent



UK Average household emissions: 8,798kg CO_2e



Heating

Aviation

Transport

Electricity

Diet/ Agriculture

Waste

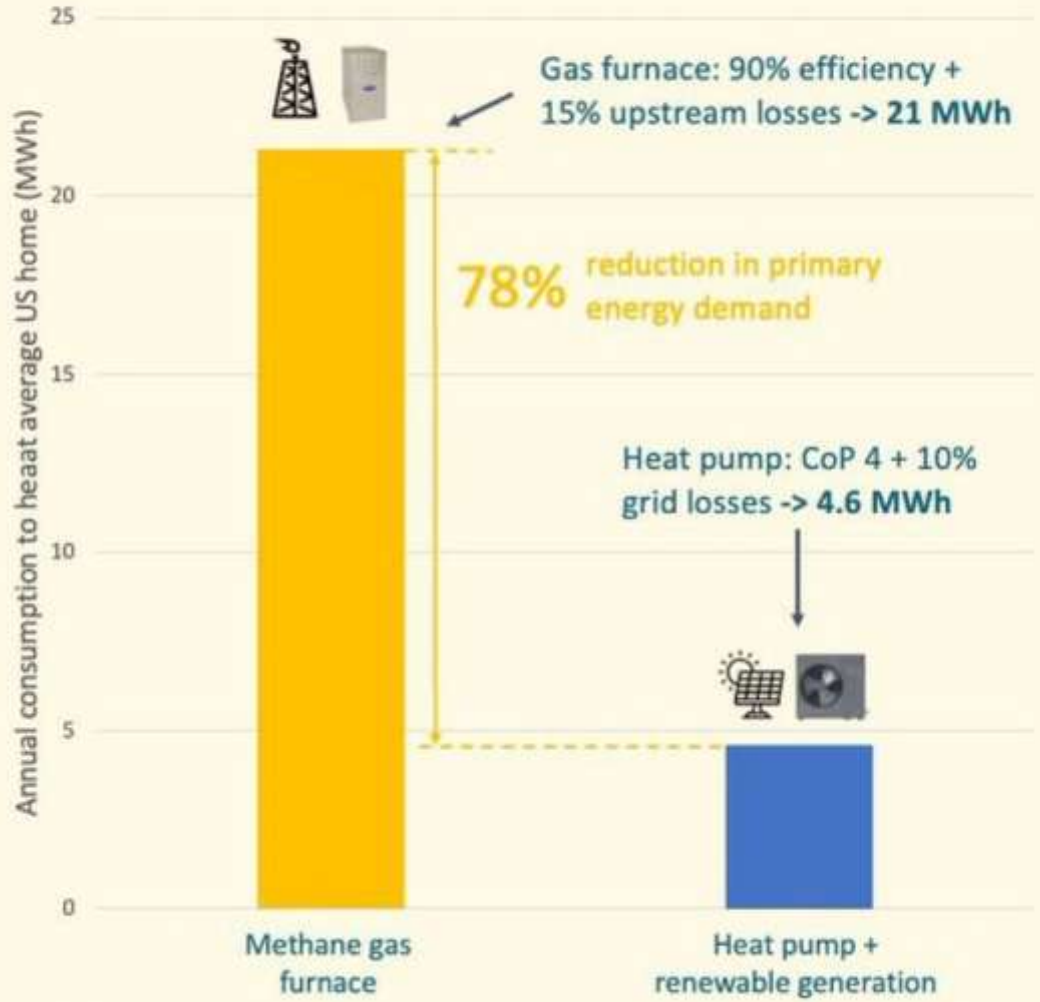
Climate Change Committee/BEIS (2019). Data is based on the UK average household emissions for 2017. CO2e is carbon dioxide equivalent – a standard measure for carbon footprint that lets other greenhouse gases be expressed in terms of the amount of CO2 that would create the same amount of global warming.

Heat Pumps

- Households are no longer required to get planning permission to place a heat pump within one meter of their neighbour’s property
  - This planning restriction has been lifted to help accelerate the uptake of low carbon heating systems.
  - The restriction had been in place because of noise concerns. While they will still need to be below a certain volume level, noise levels are typically less of an issue with newer models.

The primary energy fallacy: heating

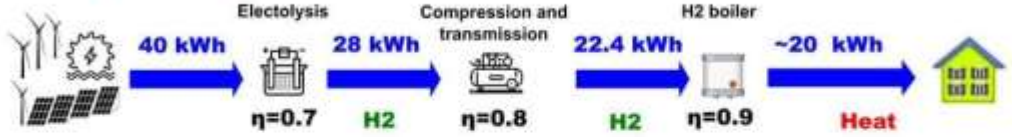
Don't let naysayers tell you we'll never be able to generate enough renewable energy to replace today's energy needs. We won't need to.



Calculations assume annual heating of 57 million BTU
Source: BloombergNEF / Michael Liebreich

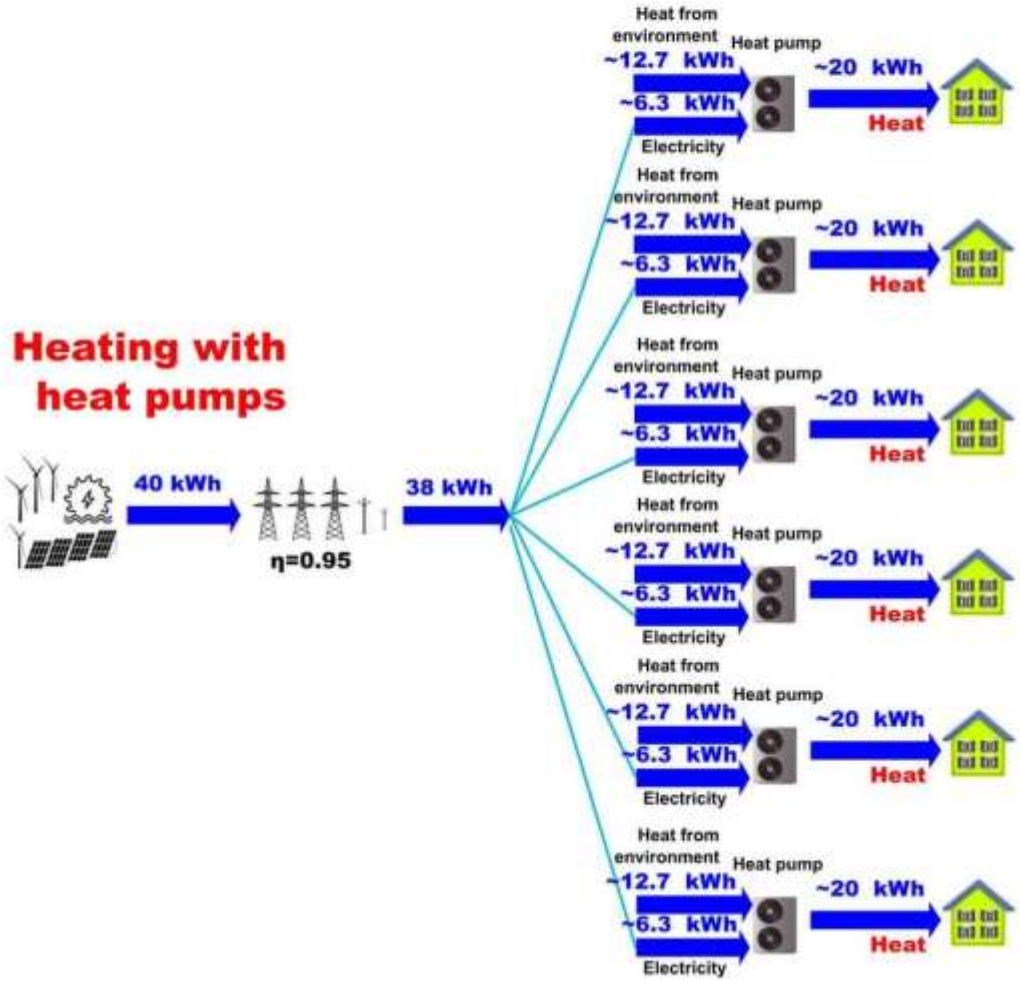
@gavinmooney

Heating with hydrogen



1x

Heating with heat pumps



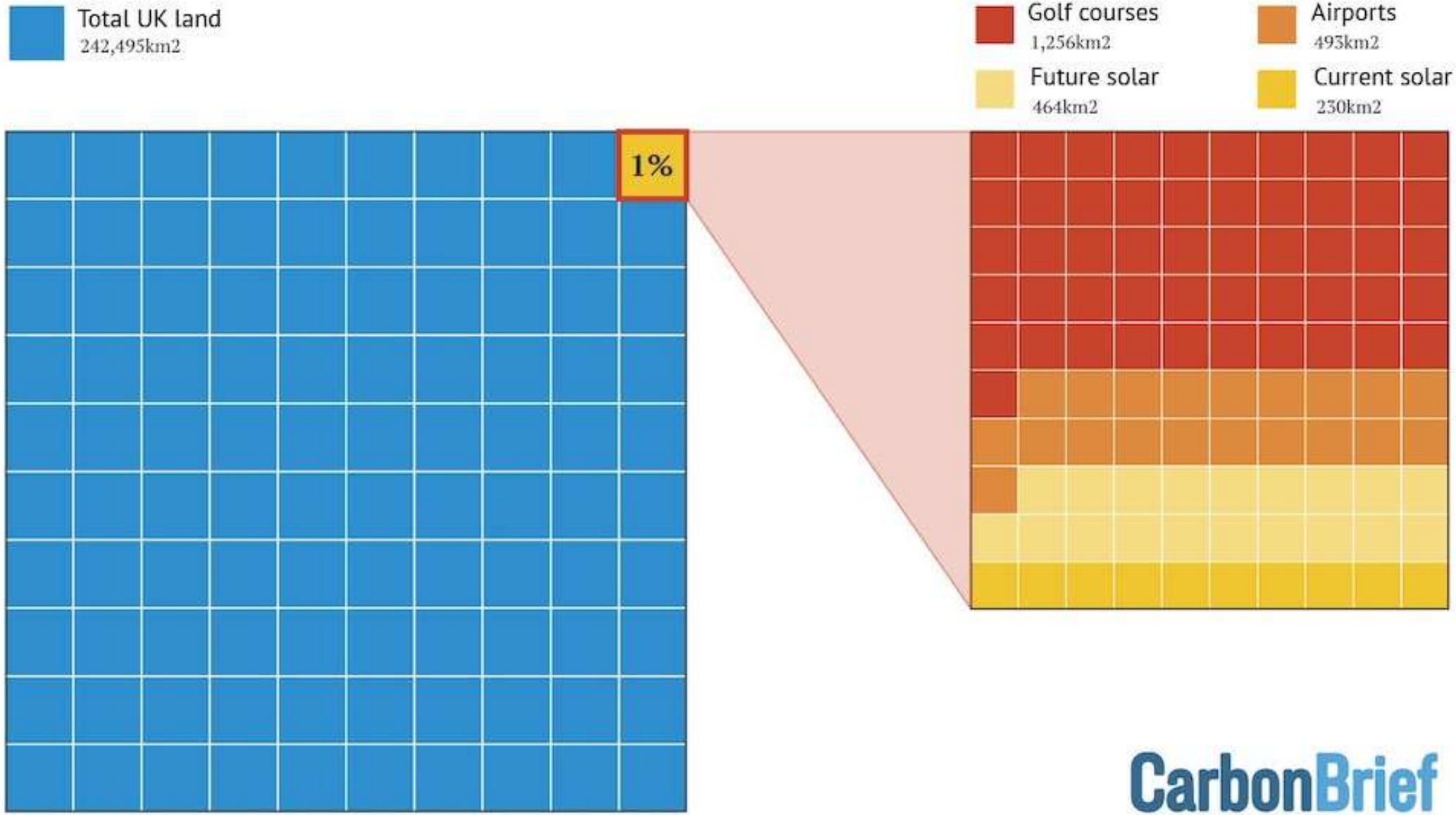
6x

© Michael Sura

Heating

Golf courses take up more space than solar power in the UK

Current and future solar power land use compared to other uses



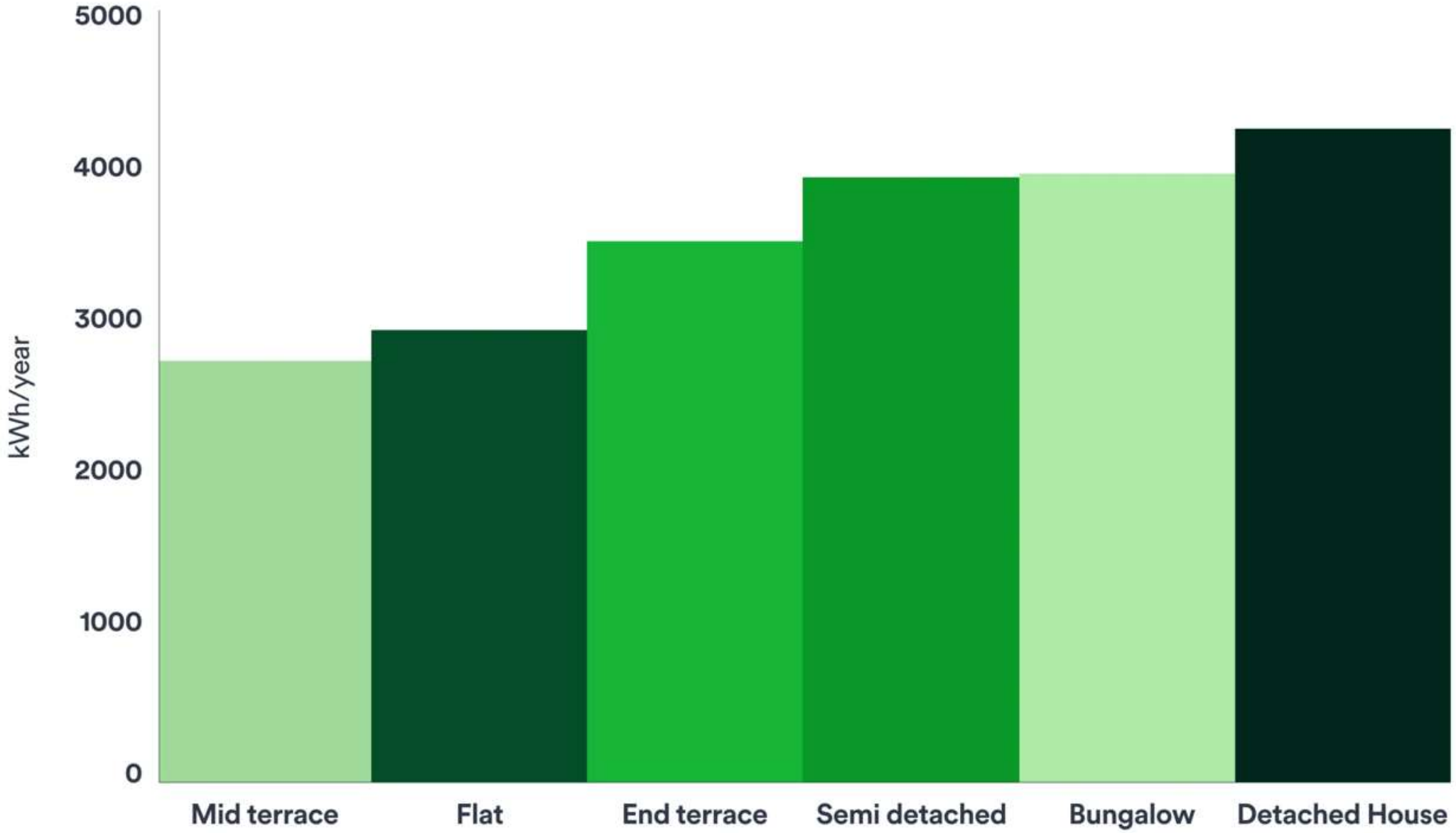
CarbonBrief
CLEAR ON CLIMATE

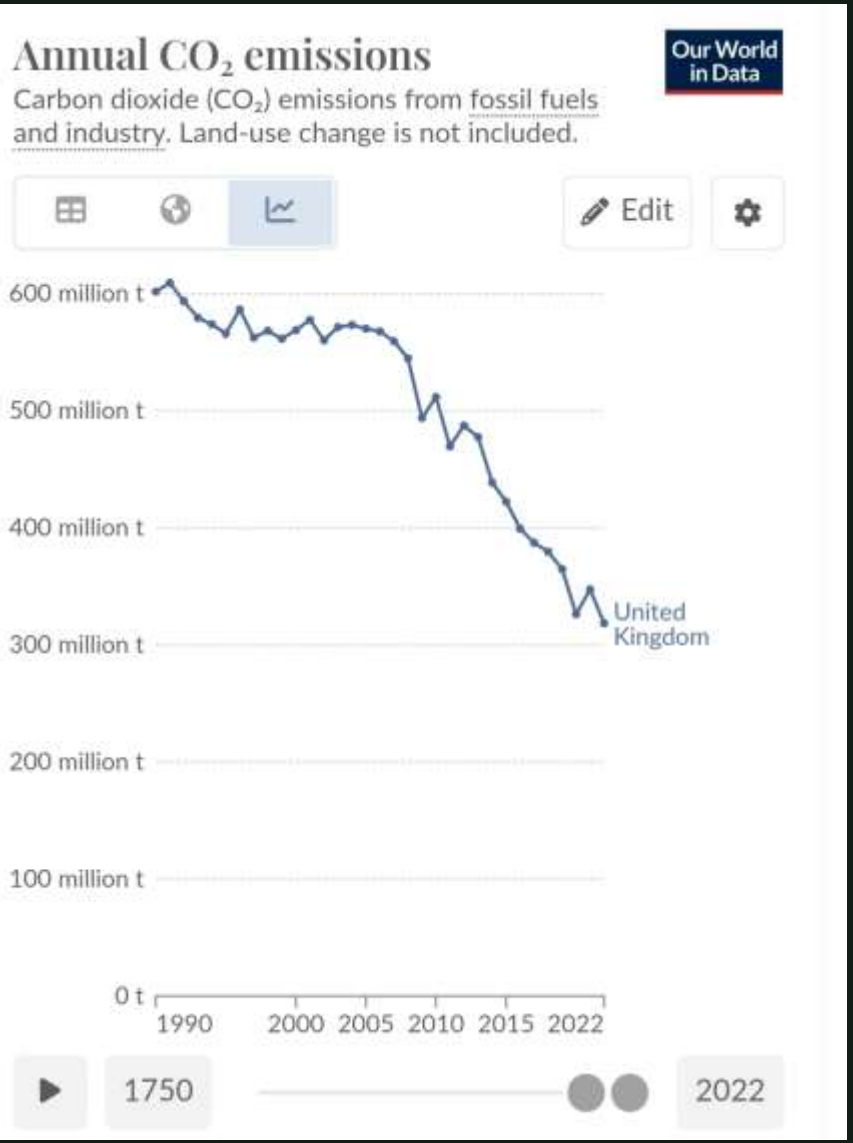
Golf vs Solar

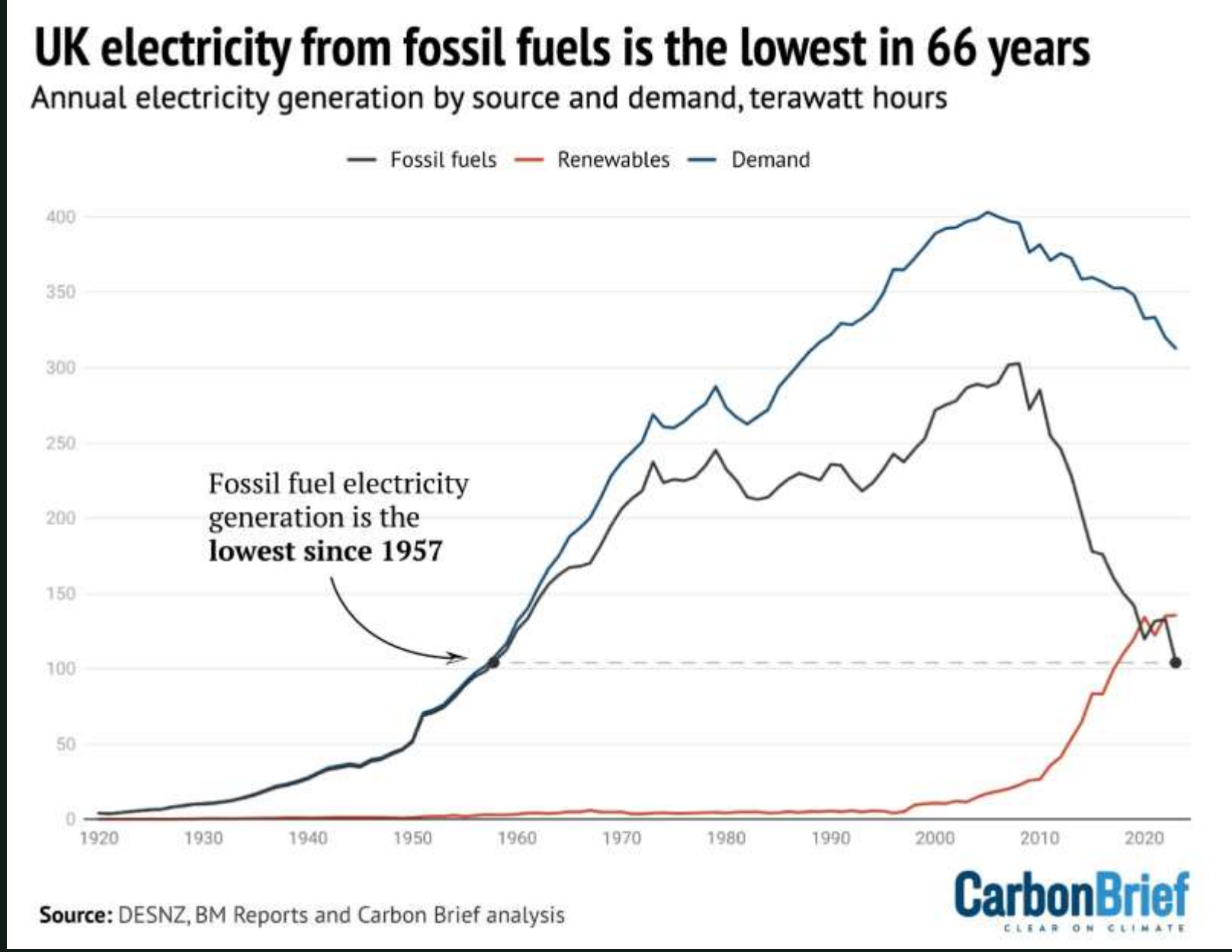
Sustainable Ferriby

Average annual electricity use by house type (kWh/year)

Figures include all electricity use, except for space heating




Annual CO_2 emissions
Our World in Data
Carbon dioxide (CO_2) emissions from fossil fuels and industry. Land-use change is not included.
Edit
600 million t
500 million t
400 million t
300 million t
200 million t
100 million t
0 t
United Kingdom
1990
2000
2005
2010
2015
2022
1750
2022

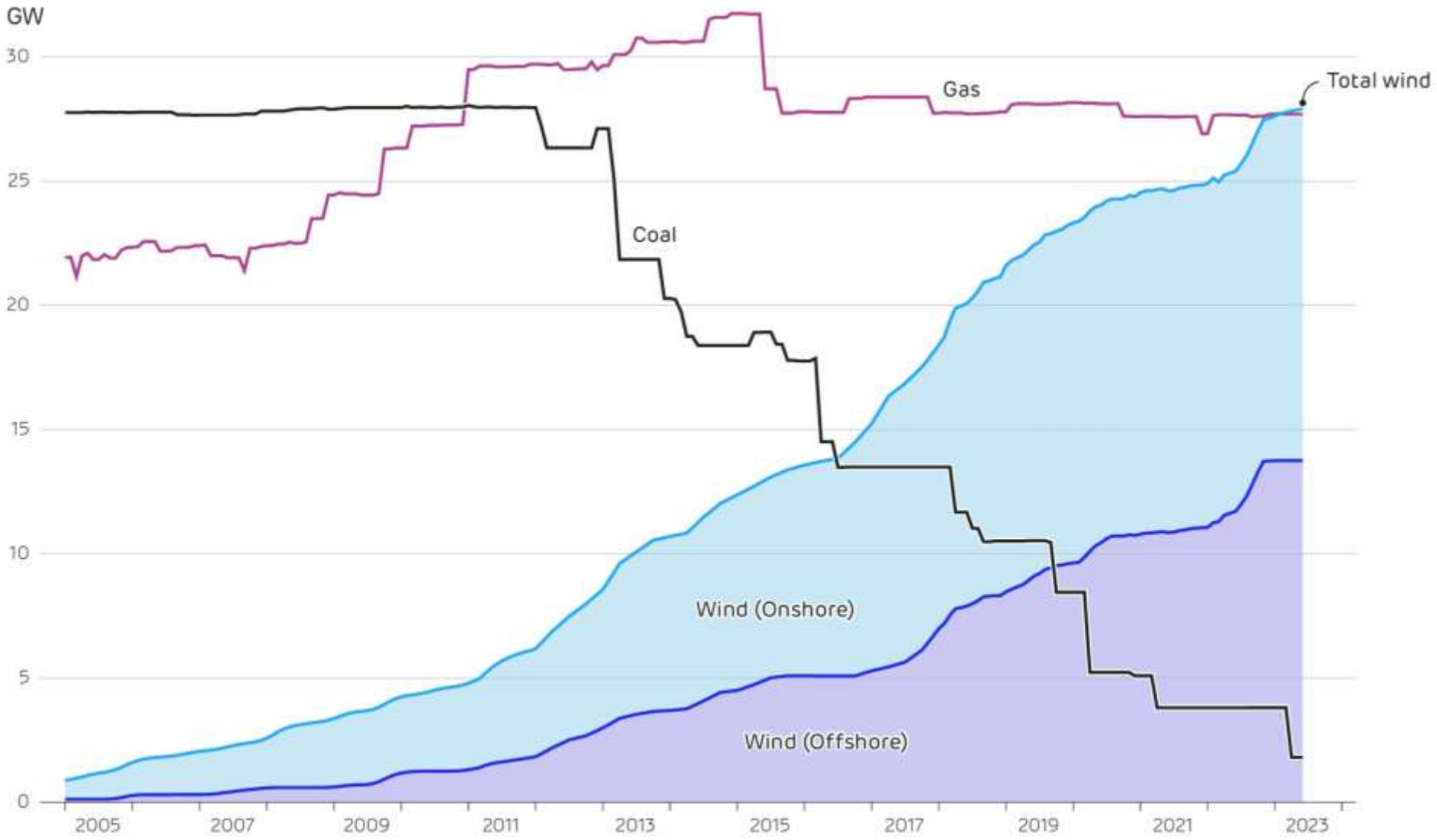

UK electricity from fossil fuels is the lowest in 66 years
Annual electricity generation by source and demand, terawatt hours
Fossil fuels
Renewables
Demand
400
350
300
250
200
150
100
50
0
Fossil fuel electricity generation is the lowest since 1957
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020
Source: DESNZ, BM Reports and Carbon Brief analysis
CarbonBrief
CLEAR ON CLIMATE

Welcome to

Sustainable Ferriby 2025

Order tea, coffee etc from the bar, make yourself comfortable, we begin at 9:30

Britain's installed capacity of power stations over the past two decades

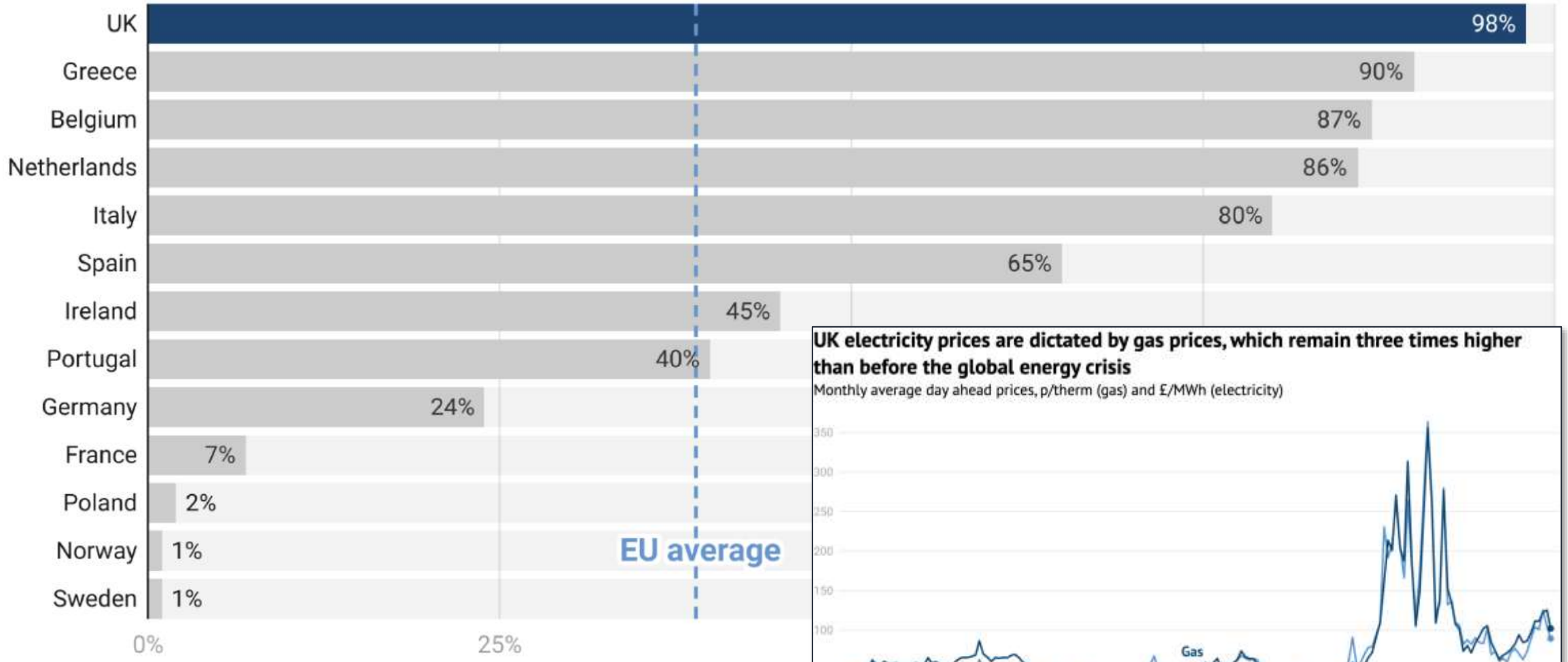


1 That is 27.9 GW of wind in Great Britain (England, Scotland and Wales), and 28.9 GW in the United Kingdom (including Northern Ireland). Both values overtook the capacity of natural gas power stations (27.7 GW in Britain and 28.7 GW in the UK).

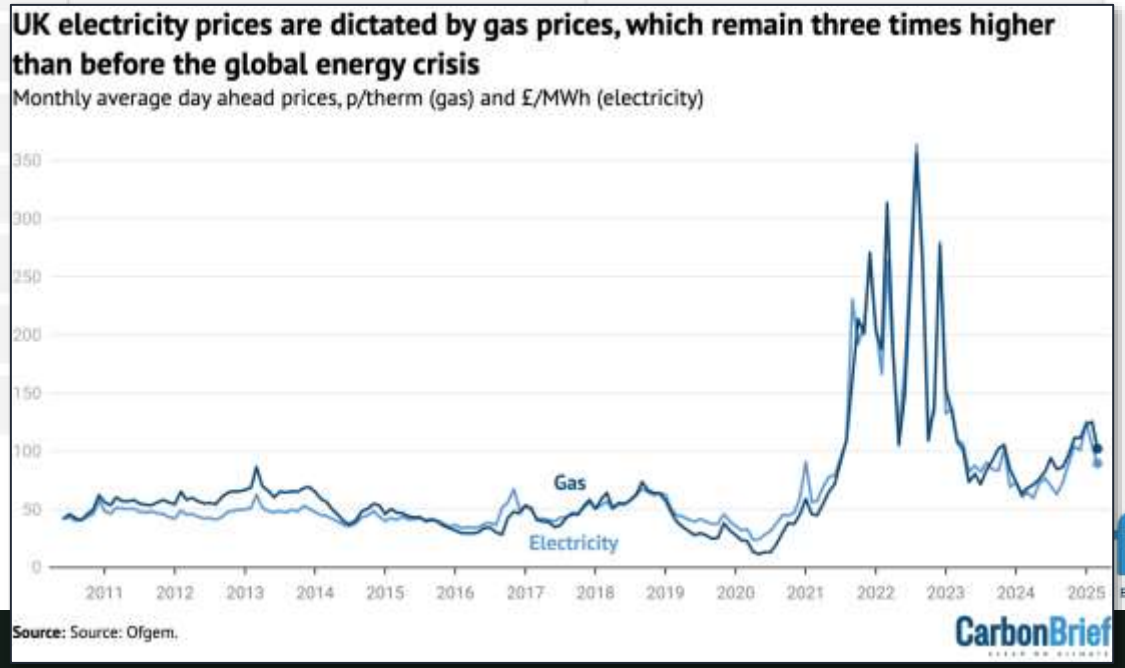
2 £60 billion in today's money, calculated from the annual average capital cost of wind turbines back to 2005 multiplied by the capacity built in each year. This is split between onshore and offshore capacity (approx. £21 billion for onshore and £39 billion for offshore).

Gas sets UK electricity prices far more often than elsewhere in Europe

Share of hours where gas sets the price, %



Source: Zakeri and Staffell, 2023

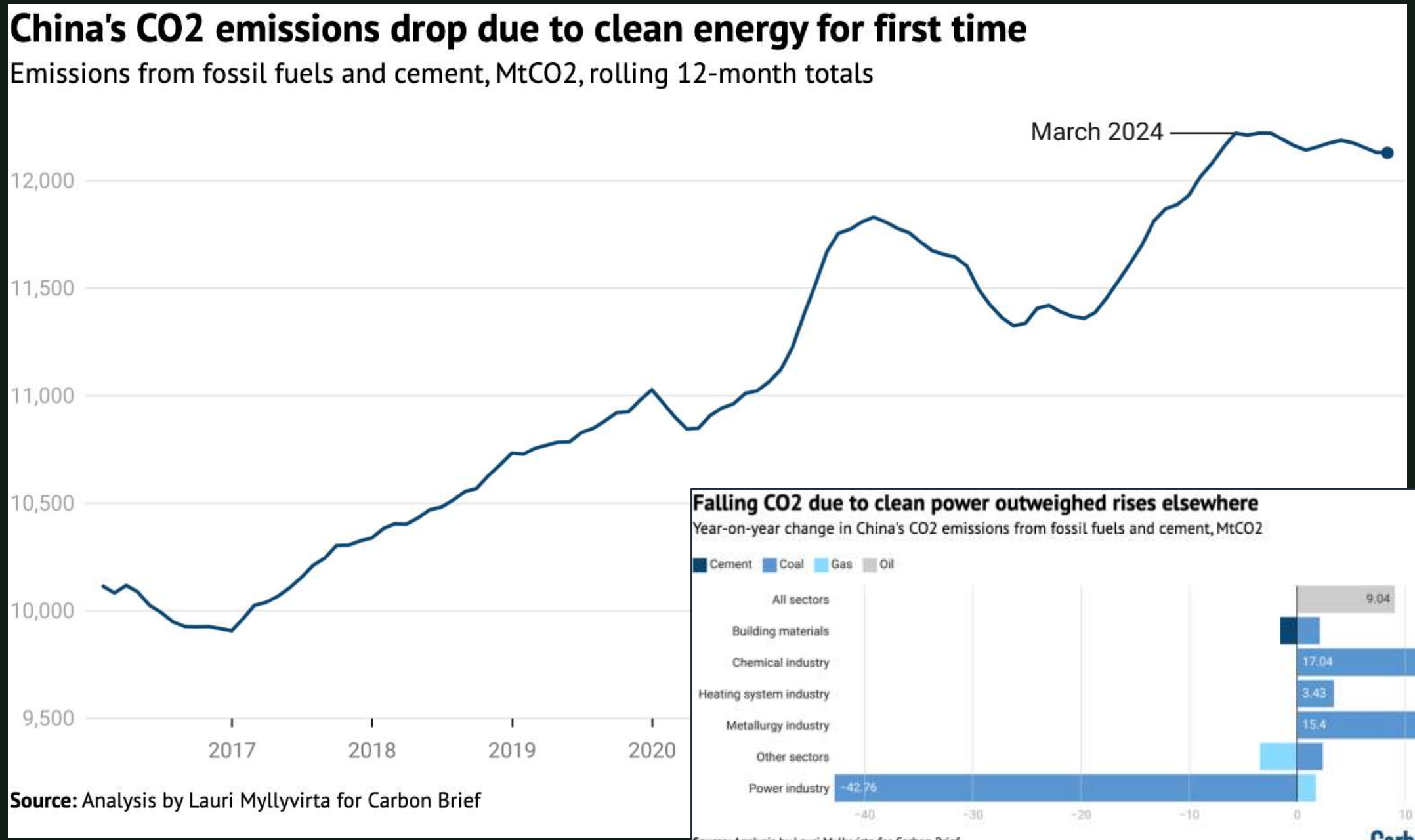


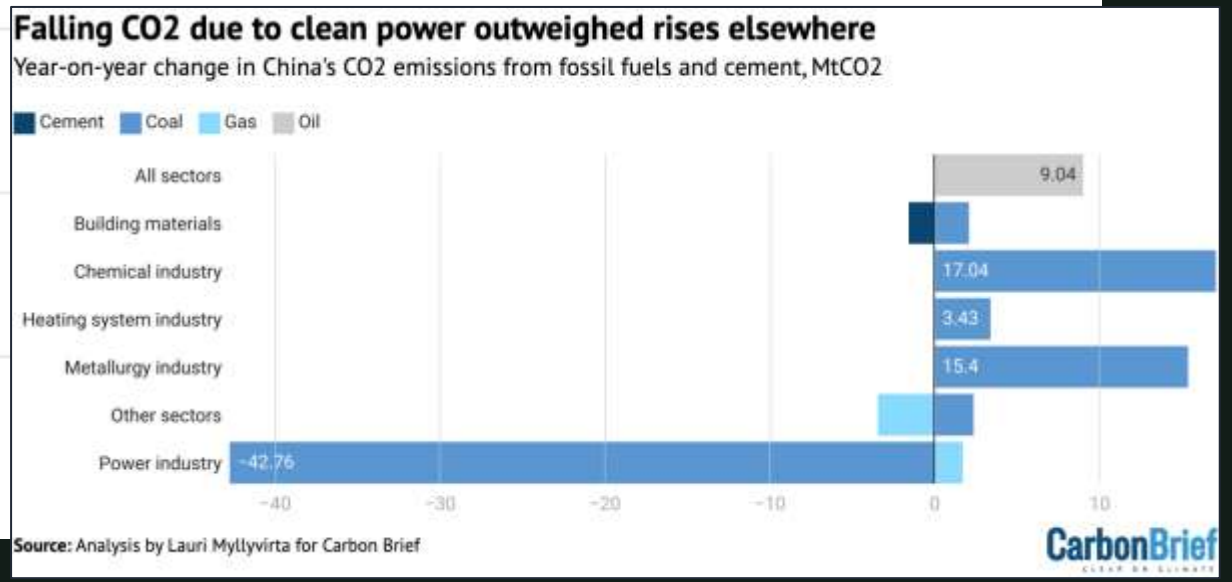
High gas prices have caused most of the rise in household electricity bills since before the global energy crisis

Change since pre-crisis levels, £

Source: Carbon Brief analysis of Ofgem data

CarbonBrief
CLEAR ON CLIMATE


China's CO2 emissions drop due to clean energy for first time
Emissions from fossil fuels and cement, MtCO2, rolling 12-month totals
March 2024
12,000
11,500
11,000
10,500
10,000
9,500
2017
2018
2019
2020
Source: Analysis by Lauri Myllyvirta for Carbon Brief


Falling CO2 due to clean power outweighed rises elsewhere
Year-on-year change in China's CO2 emissions from fossil fuels and cement, MtCO2
Cement
Coal
Gas
Oil
All sectors
Building materials
Chemical industry
Heating system industry
Metallurgy industry
Other sectors
Power industry
9.04
17.04
3.43
15.4
-42.76
-40
-30
-20
-10
0
10
Source: Analysis by Lauri Myllyvirta for Carbon Brief
CarbonBrief


ALL THE METALS WE MINED
IN 2021
The world produced roughly 2.8 billion tonnes of metals in 2021.
Here are all the metals we mined, visualized on the same scale.
IRON ORE
2,600,000,000 tonnes*
= 1,000,000 tonnes
Iron Ore*
2.6B
LARGEST END-USE
Steelmaking
Construction
Chemicals
Alloying Agents
Energy/Batteries
Magnets
Electronics
Other
INDUSTRIAL METALS
181,579,892 tonnes
Aluminum**
68.0M
Copper
21.0M
Chromium
41.0M
Manganese
20.0M
Magnesium**
950K
Lead
4.3M
Zinc 13.0M
Nickel
2.7M
Titanium***
9.0M
Zircon*
1.2M
Strontium 360K
Uranium 48.3K
Bismuth** 19K
Mercury 2.3K
Beryllium 260
TECHNOLOGY AND PRECIOUS METALS
1,474,889 tonnes
Molybdenum
300K
Lithium
106K
Tungsten
79K
Tin
300K
Rare Earth Oxides
280K
Niobium
75K
Cobalt
170K
Vanadium
110K
Silver
24K
Cadmium
24K
Gold
3K
Tantalum
2.1K
Indium**
920
Gallium
430
Platinum Group Metals
380
Rhenium
59
ELEMENTS
Source: USGS Mineral Commodity Summaries (2022)
*Ore production does not reflect actual metal production as metals only make up a certain portion of ores.
**Smelter/refinery production.
***Represents titanium mineral concentrate production.
ELEMENTS.VISUALCAPITALIST.COM


WORLD
OIL
RIG
CREW
DAVID
SIMONDS
10.9.17.

Try your hand at our quiz

Scan the QR code or use the URL

https://forms.office.com/e/kpM5Hp6KiP

Try your hand at our quiz

Scan the QR code or use the URL

https://forms.office.com/e/kpM5Hp6KiP

Try your hand at our quiz

Scan the QR code or use the URL

https://forms.office.com/e/kpM5Hp6KiP