



# Next Greening Presentation

**A Quiz on Greening Stuff**

John Butterworth. 29 October 2025



# QUIZ ANSWERS

# **Part One - You and you Household**

**1 Household energy is talked about by your energy supplier as 'Kilowatt-Hours' (kWh). What is one kilowatt-hour?**

- a) The amount of power you use over a period of one hour, e.g. 1 kW for 1 hour, 2 kW for half an hour.
- b) A unit deliberately chosen by suppliers to confuse us
- c) Well *something* comes out of the plughole, so we must call it *something*...

**2 Your Electricity is charged 'per Kilowatt Hour'. Roughly how much does 1 kWh cost?**

- a) 10p
- b) 26p
- c) £1
- d) £2

**3 Same for Gas - Roughly how much does 1kWh cost?**

- a) 1p
- b) 6p
- c) £1
- d) £2

**1 Household energy is talked about by your energy supplier as 'Kilowatt-Hours' (kWh). What is one kilowatt-hour?**

a) The amount of power you use over a period of one hour, e.g. 1 kW for 1 hour, 2 kW for half an hour.

**2 Your Electricity is charged 'per Kilowatt Hour'. Roughly how much does 1 kWh cost?**

b) 26p

**3 Same for Gas - Roughly how much does 1kWh cost?**

b) 6p

**4 When the 'Price Cap' is set for energy prices by Ofgem, it is always expressed in terms of a 'typical household bill', say £1755 per year (the current Price Cap). But how much electricity and gas do Ofgem assume you'll be using in a year?**

- a) Gas 11500kWh Electricity 2700kWh
- b) Gas 2000kWh Electricity 1000kWh
- c) Gas 50000kW Electricity 40000kWh
- d) I have absolutely no idea.

**5 That last question was really annoying. I think I'll find out how much I use. I can find out from -**

- a) I can't find out. It will remain a mystery forever
- b) From my gas and electricity bill. I just never looked.
- c) By ringing Ofgem and asking what on earth they are taking about
- d) I could look online on my supplier's website

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b). From my gas and electricity bill. I just never looked.

d). I could look online on my supplier's website

**6 You've inherited a very chilly stone terraced house in Old Town, and decide to insulate it from the cold. Where's the best place to start, to get best value for your money?**

- a)The Loft
- b)Double glazing
- c)The walls
- d)Forget it, just put on a big thick coat

**7 You think it wise to cut down your energy use, by being careful about which electrical devices to use. But which uses the most energy per hour?**

- a) Your flat screen TV
- b)The washing machine
- c)The tumble drier
- d)The dishwasher

**6 You've inherited a very chilly stone terraced house in Old Town, and decide to insulate it from the cold. Where's the best place to start, to get best value for your money?**

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c). The tumble dryer

# START WITH LOFT INSULATION!



**270mm 10.6" LOFT INSULATION**

**(With no insulation, 20% of your cash goes out through the ceiling.)**

**Much reduced heat loss.  
Loft may need ventilation...**

**'Payback' about 4 years or less**

**Definitely do it!**



**8 Perhaps you decide to insulate your loft. What's the minimum thickness of LOFT insulation that the Government in it's wisdom recommends?**

- a) 15cm (6 inches)
- b) 270mm (10.6 inches).
- c) 300mm (12 inches)
- d) There is no recommended minimum. Do your own thing!

**9 If you looked up the Building Regulation about insulation, you might find reference to 'U-Values'. What the heck are U-Values?**

- a) A measure of how effective insulation is, measured in how thick it is in centimetres?
- b) A measure of the rate of heat transfer through a material?
- c) It means 'Usefulness' of the material?
- d) Who cares?

**10 Let's say we have become deeply interested in this mysterious 'U-Value'. What units might it be measured in?**

- a) How thick the insulation is, in inches or centimetres?
- b) How 'Useful' it is, in units of Usefulness?
- c) Watts per square metre per degree Kelvin (how much heat passes through for each degree of temperature difference between the inside and outside)?
- d) I told you, I don't care.

**8 Perhaps you decide to insulate your loft. What's the minimum thickness of LOFT insulation that the Government in it's wisdom recommends?**

b) 270mm (10.6 inches).

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b) A measure of the rate of heat transfer through a material

**10 Let's say we have become deeply interested in this mysterious 'U-Value'. What units might it be measured in?**

c) Watts per square metre per degree Kelvin (how much heat passes through for each degree of temperature difference between the inside and outside)

**11 This pesky house is damp as well as cold. You have a very limited budget but *can* afford a little extractor fan. Where's the best place to install it?**

- a) The main bedroom?
- b) The living room?
- c) The attic?
- d) The bathroom?

**11 This pesky house is damp as well as cold. You have a very limited budget but *can* afford a little extractor fan. Where's the best place to install it?**

d)The bathroom. Warm air holds more moisture than cold air. Usually invisible, but so bad after a shower or bath, it appears as steam. This condenses on cold surfaces, so EXTRACT it! Kitchen runs it a close second.

# **Part 2      The UK**

## **PART 2 The UK**

**1. What is our biggest source of energy (i.e. not just electricity), in the UK?**

**a)Coal**

**b)Gas**

**c)Oil**

**d)Offshore wind**

## PART 2. The UK

### 1. What is our biggest source of energy (i.e. not just electricity), in the UK?

Answer - c) OIL

#### Per capita primary energy consumption by source, United Kingdom, 2024

Our World  
in Data

Primary energy<sup>1</sup> is measured in kilowatt-hours<sup>2</sup> per person, using the substitution method<sup>3</sup>.

■ Coal ■ Oil ■ Gas ■ Nuclear ■ Hydropower ■ Wind ■ Solar ■ Other renewables



**2. Different question - what is the biggest source of electricity in the UK?**

**a)Coal**

**b)Gas**

**c)Oil**

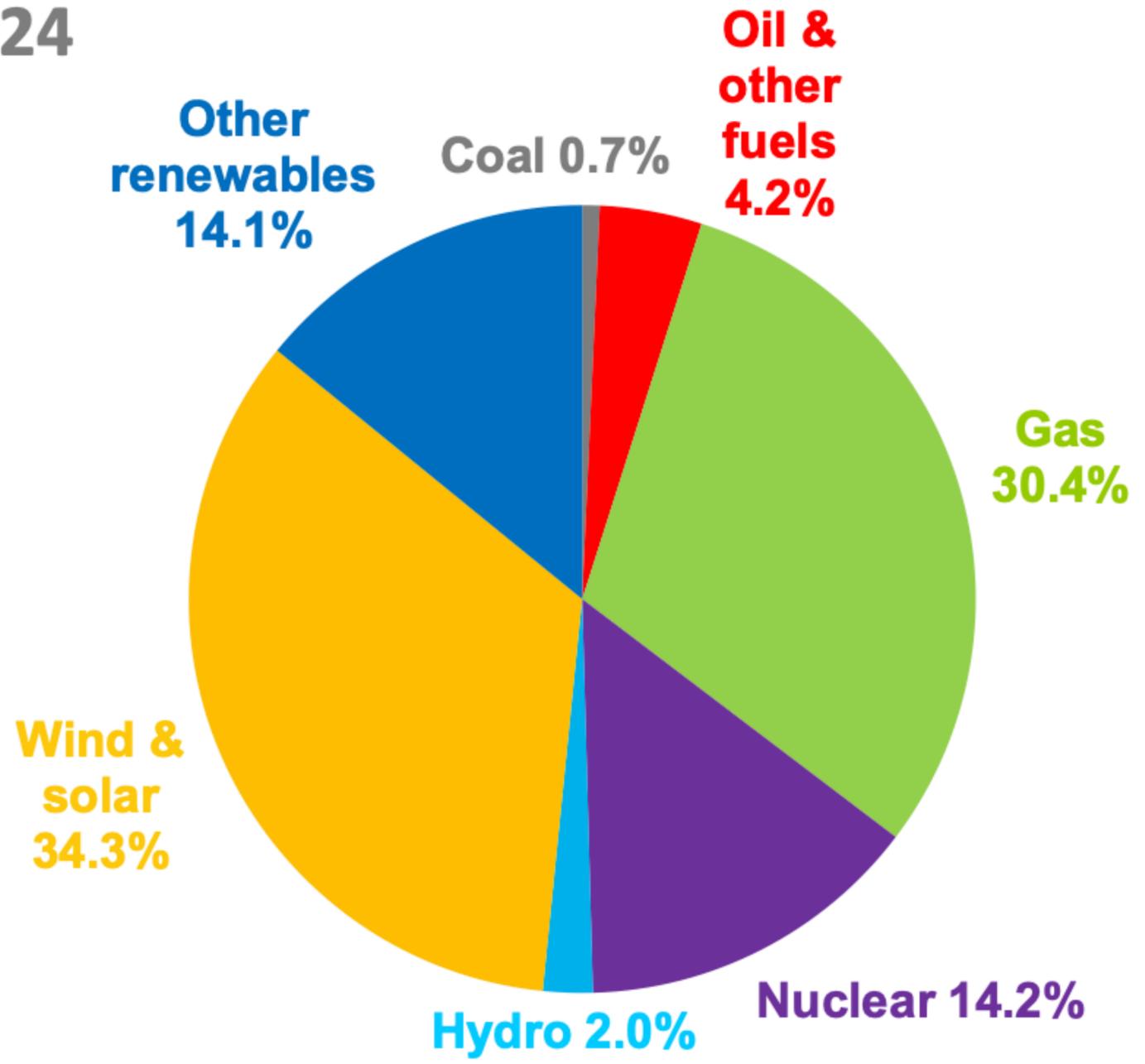
**d)Wind and Solar**

2. Different question - what is the biggest source of electricity in the UK?

Electricity generated by fuel type, 2024

d) WIND AND SOLAR

2024



Source UK Energy in Brief 2025 HMG

**3. What sector is the biggest user of energy in the UK?**

**a)Transport inc Air Travel**

**b)Industry**

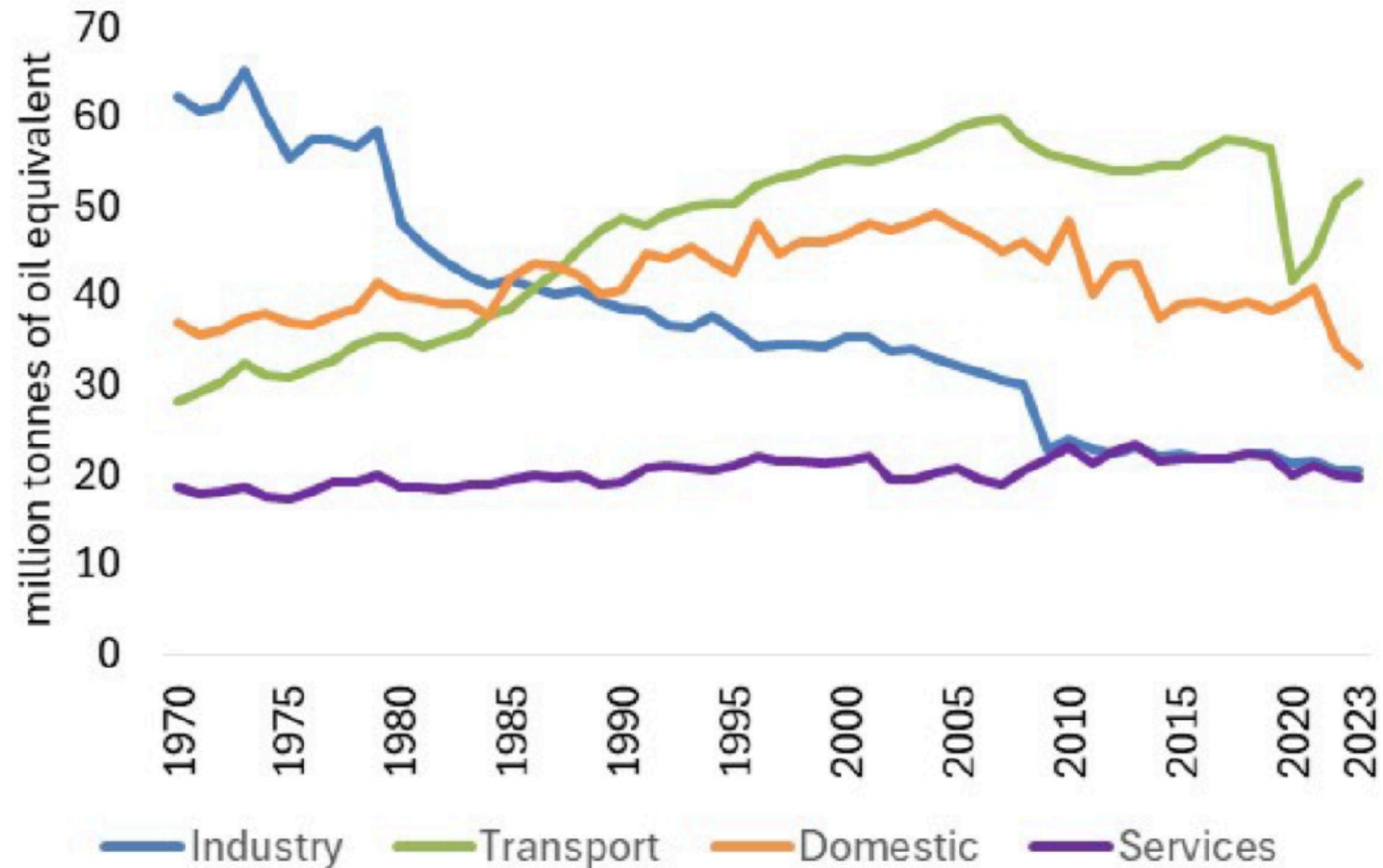
**c)Domestic users, i.e. us**

**d)Services**

### 3. What sector is the biggest user of energy in the UK?

#### a) Transport inc Air Travel

Energy consumption by sector, 1970 to 2023 (Table C1)



**4. What sector is the biggest user of electricity in the UK?**

**a)Transport**

**b)Industry**

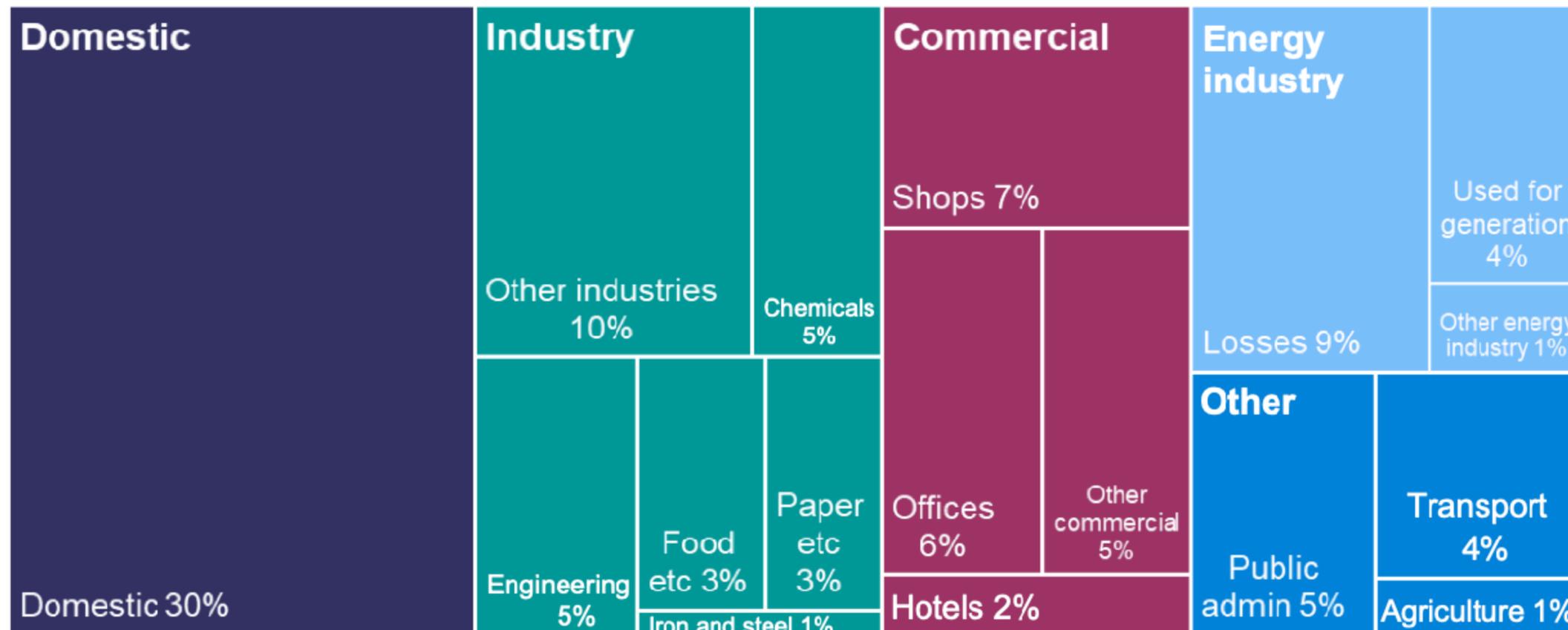
**c)Domestic users, i.e. us**

**d)Advertising**

## 4. What sector is the biggest user of electricity in the UK?

### C. Domestic users, i.e. us

Chart 5.2 Share of total electricity demand split by sector, 2024 ([DUKES Table 5.2](#))



**Domestic users accounted for the largest share of total electricity demand (29.6 per cent), which is 0.4 percentage points above the 2023 share (29.2 per cent).** Industrial consumption made up 25.8 per cent, which is 1.4 percentage points lower than 2023's share (27.2 per cent), while commercial consumption accounted for 19.6 per cent, similar to the previous year.

**5. What does the UK class as 'Green energy'?**

**a) Only Wind, solar and hydro-electricity.**

**b) Only Wind and solar.**

**c) Only Wind, solar, hydro-electricity and nuclear**

**d) All the above plus biomass, landfill gas, sewage treatment gas and more...**

## **5. What does the UK class as 'Green energy'?**

**d) All the above plus biomass, landfill gas, sewage treatment gas and more...**

The Promotion of the Use of Energy from Renewables Sources Regulations 2011 (SI 2011/243) applies the definition set out in Directive 2009/28/EC (Renewable Energy Directive) on the promotion of the use of energy from renewable sources. This defines 'energy from renewable sources' as 'energy from renewable non-fossil sources, namely wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases', each of which is then defined separately.

**6. The UK is said to have very expensive energy, compared to the EU and the USA. Why?**

**a) We still use expensive coal-fired power stations**

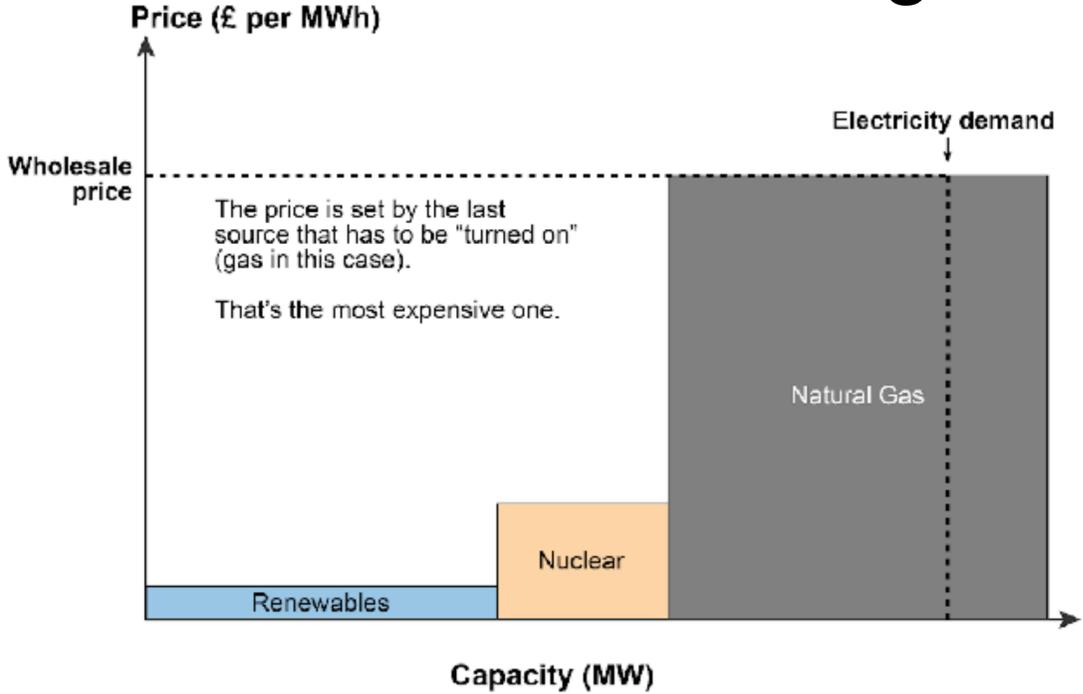
**b) We use relatively expensive wind and solar power**

**c) It must be something to do with nuclear power. Never did like the sound of that.**

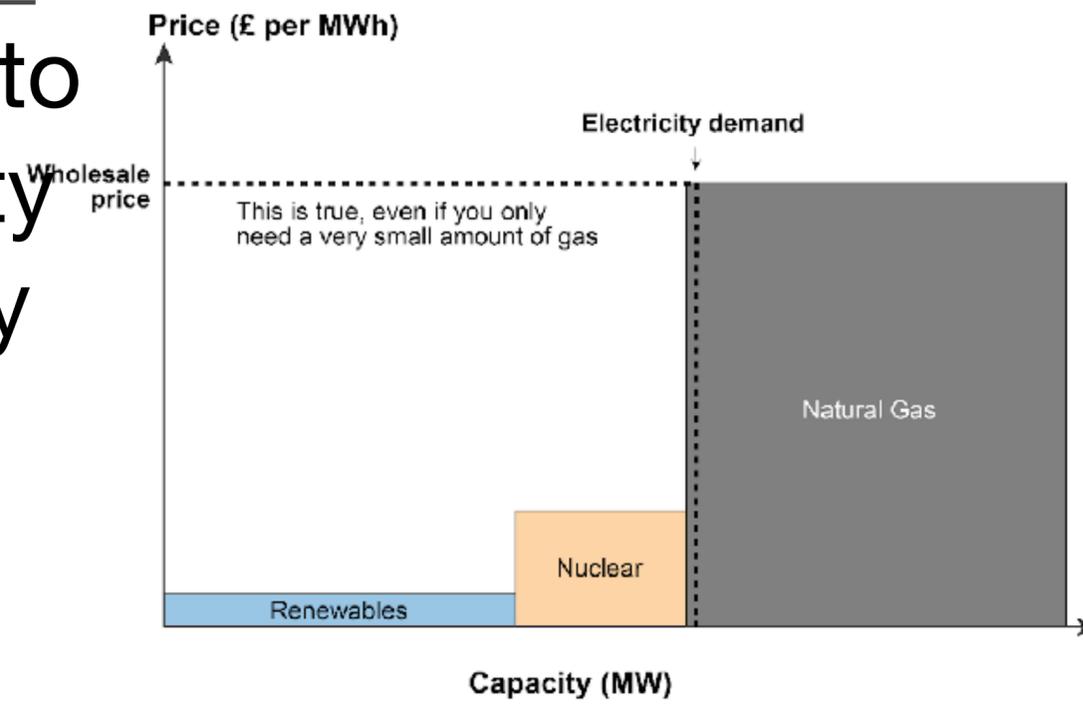
**d) The price is always based on the spot price of gas, no matter how little is being used in generating electricity.**

# 6. The UK is said to have very expensive energy, compared to the EU and the USA. Why?

d) The price is always based on the spot price of gas, no matter how little is being used in generating electricity.



wholesale electricity prices are determined in a way that essentially means that everyone has to pay for the most expensive source of electricity used at a given time, which in the UK is mostly gas power plants.



**7. Where does the UK get the majority of its gas from?**

- a). The North Sea, obviously. We have North Sea Gas!**
- b) The North Sea, but supplied to us by Norway.**
- c) Qatar**
- d) The USA**

**8. We boast about not buying Russian gas any more. Does the EU still buy it?**

- a) No. As if.**
- b) Yes, but at a reducing rate following the invasion of Ukraine**
- c) Yes; it was at a reduced rate but it's creeping back up in 2025**
- d) Yes, but they've agreed to stop, by the end of 2027**

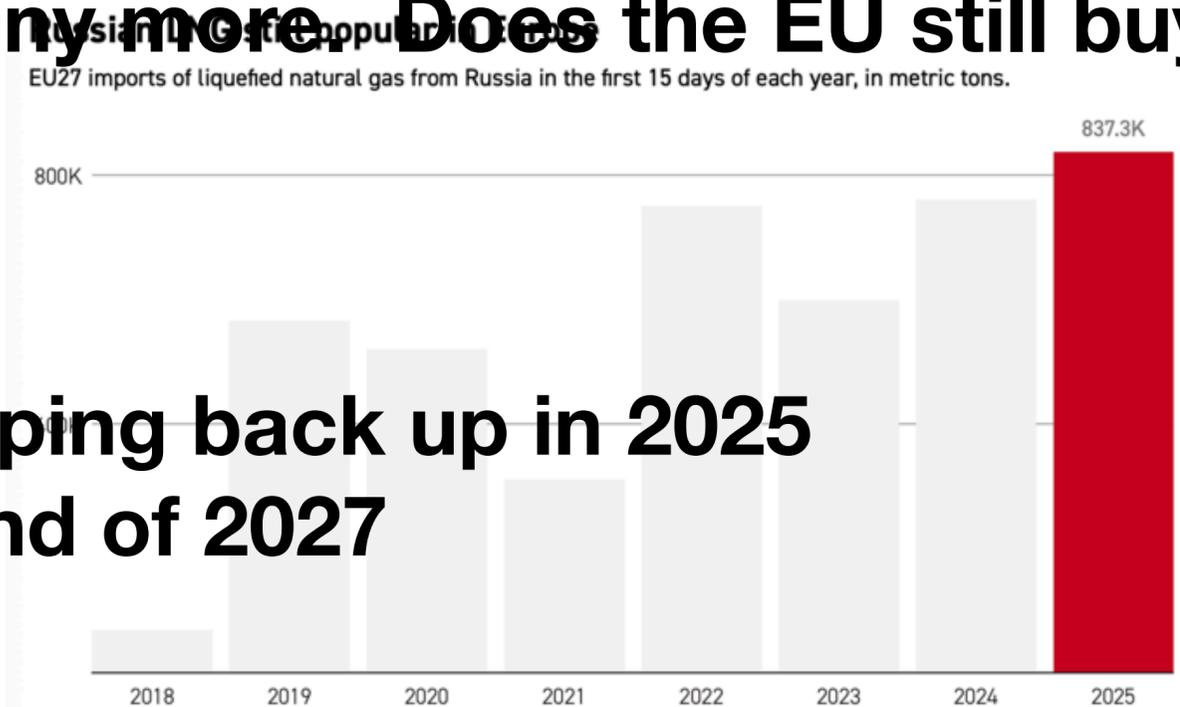
7. Where does the UK get the majority of its gas from?

- a)
- b) **The North Sea, but supplied to us by Norway.**
- c)
- d)

Source	Quantity of gas (TWh, 2024)	% of total (2024)
Norway	345.9	50.2
Domestic (North Sea)	232.5	33.8
US	75.7	11
Qatar	8.6	1.2
Trinidad and Tobago	7.4	1.1
Algeria	5.3	0.8
Angola	3.9	0.6
Peru	3.8	0.6

8. We boast about not buying Russian gas any more. Does the EU still buy it?

- a)
- b)
- c) **Yes; it was at a reduced rate but it's creeping back up in 2025**
- d) **Yes, but they've agreed to stop, by the end of 2027**



**9. Still looking at our expensive electricity prices - France prices it's electricity the same way as the UK (a weird system called 'Marginal Pricing') so why would their electricity price be a lot less than ours?**

- a). Because they're French. They just do it to annoy us.**
- b). They have loads more nuclear power than the UK. Makes all the difference.**
- c). They are further south.**
- d) The French Government subsidise the generating companies. Typical.**

**10. What about the Germans, I hear you cry? How does their electricity price compare to ours?**

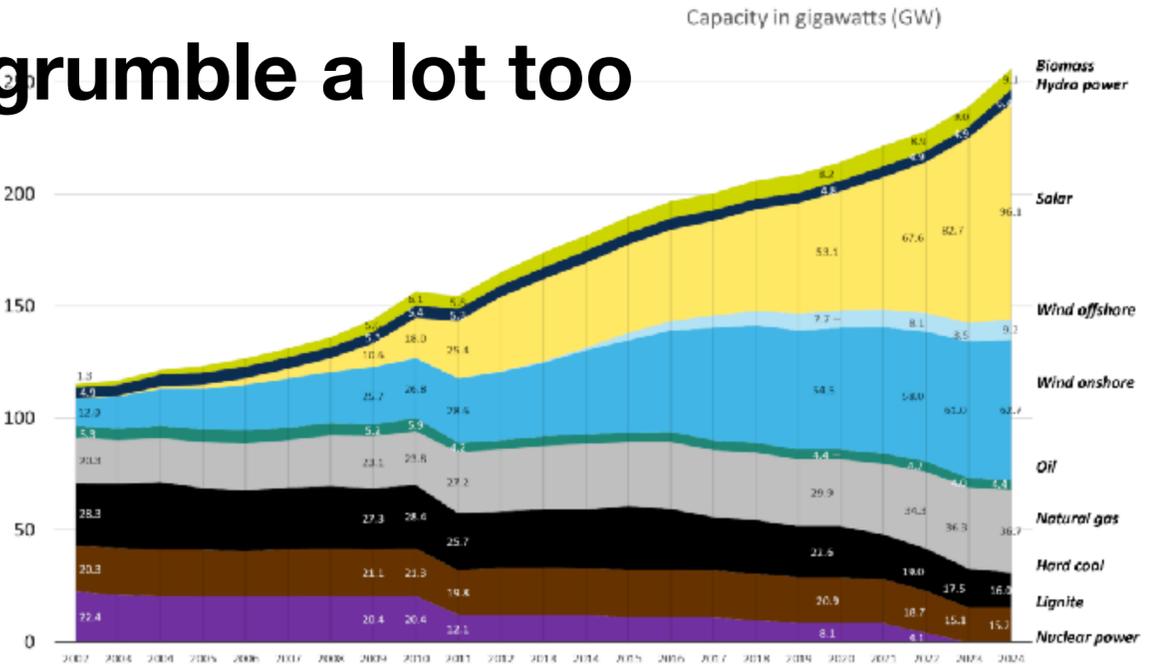
- a). It's similar to ours, so their consumers grumble a lot too**
- b). It's like ours because they use gas just the same as us.**
- c). It's cheaper, more like the French.**
- d) It's like ours, because they use coal.**

9. Still looking at our expensive electricity prices - France prices it's electricity the same way as the UK (a weird system called 'Marginal Pricing') so why would their electricity price be a lot less than ours?

- a).
- b). They have loads more nuclear power than the UK. Makes all the difference.
- c).
- d)

10. What about the Germans, I hear you cry? How does their electricity price compare to ours?

Installed net electricity generation capacity in Germany 2002 - 2024.  
 Data: Fraunhofer ISE 2024 (2024 status of 12 December).  
 CLEAN ENERGY WIRE



- a). It's similar to ours, so their consumers grumble a lot too
- b).
- c).
- d) It's like ours, because they use coal.

# **Quiz 3 Solar Panels and Wind Turbines**

**1. What is the main material in solar panels (not counting the frame and glass cover)?**

**a) Sand**

**b) Transistors**

**c) Rare Earths**

**d) Silicon**

**2. Where are most solar panels made?**

**a) The USA**

**b) Taiwan**

**c) Japan**

**d) China**

**1. What is the main material in solar panels (not counting the frame and glass cover)?**

**a) Sand**

Silicon dioxide ( $\text{SiO}_2$ ) is the chemical compound that **makes up most of sand** — especially common beach sand. Typical beach sand: **70–95% quartz ( $\text{SiO}_2$ )**

**d) Silicon**

**2. Where are most solar panels made?**

**d) China**

Solar panel production is a global industry, but it remains heavily concentrated in China which controls the vast majority of the solar panel manufacturing processes. And for as long as we need silicon to produce solar panels, this situation is unlikely to change.

**3. Which country generates the most solar energy?**

**a)The UK**

**b)The USA**

**c)China**

**d)Australia**

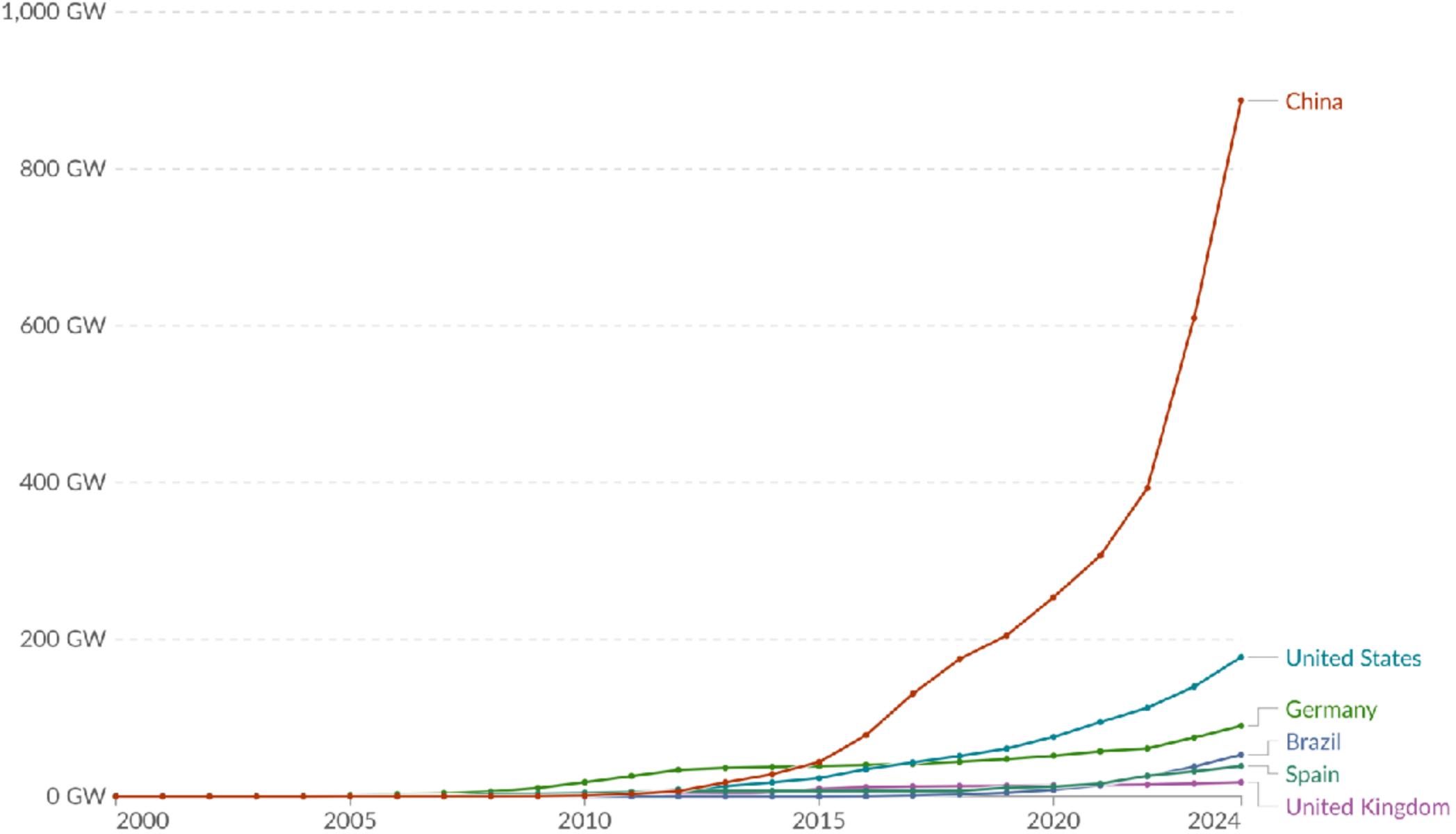
# 3. Which country generates the most solar energy?

## Installed solar energy capacity

Cumulative installed solar capacity, measured in gigawatts (GW).



C) China



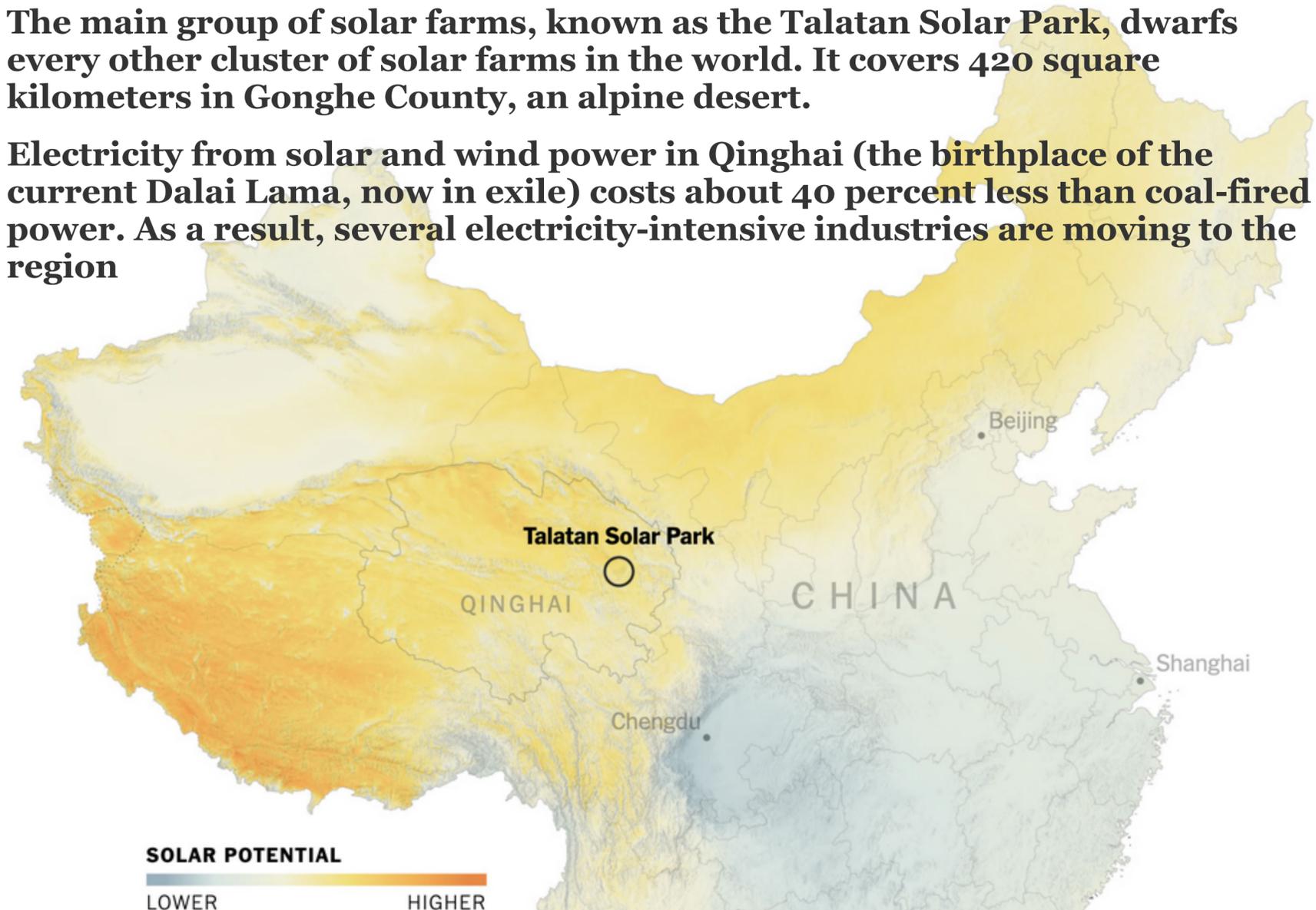
Data source: IRENA (2025)

OurWorldinData.org/renewable-energy | CC BY



The main group of solar farms, known as the Talatan Solar Park, dwarfs every other cluster of solar farms in the world. It covers 420 square kilometers in Gonghe County, an alpine desert.

Electricity from solar and wind power in Qinghai (the birthplace of the current Dalai Lama, now in exile) costs about 40 percent less than coal-fired power. As a result, several electricity-intensive industries are moving to the region



**4. Which country generates the most wind energy?**

**a)The UK, in The Houses of Parliament**

**b)China**

**c)The UK**

**d)The USA**

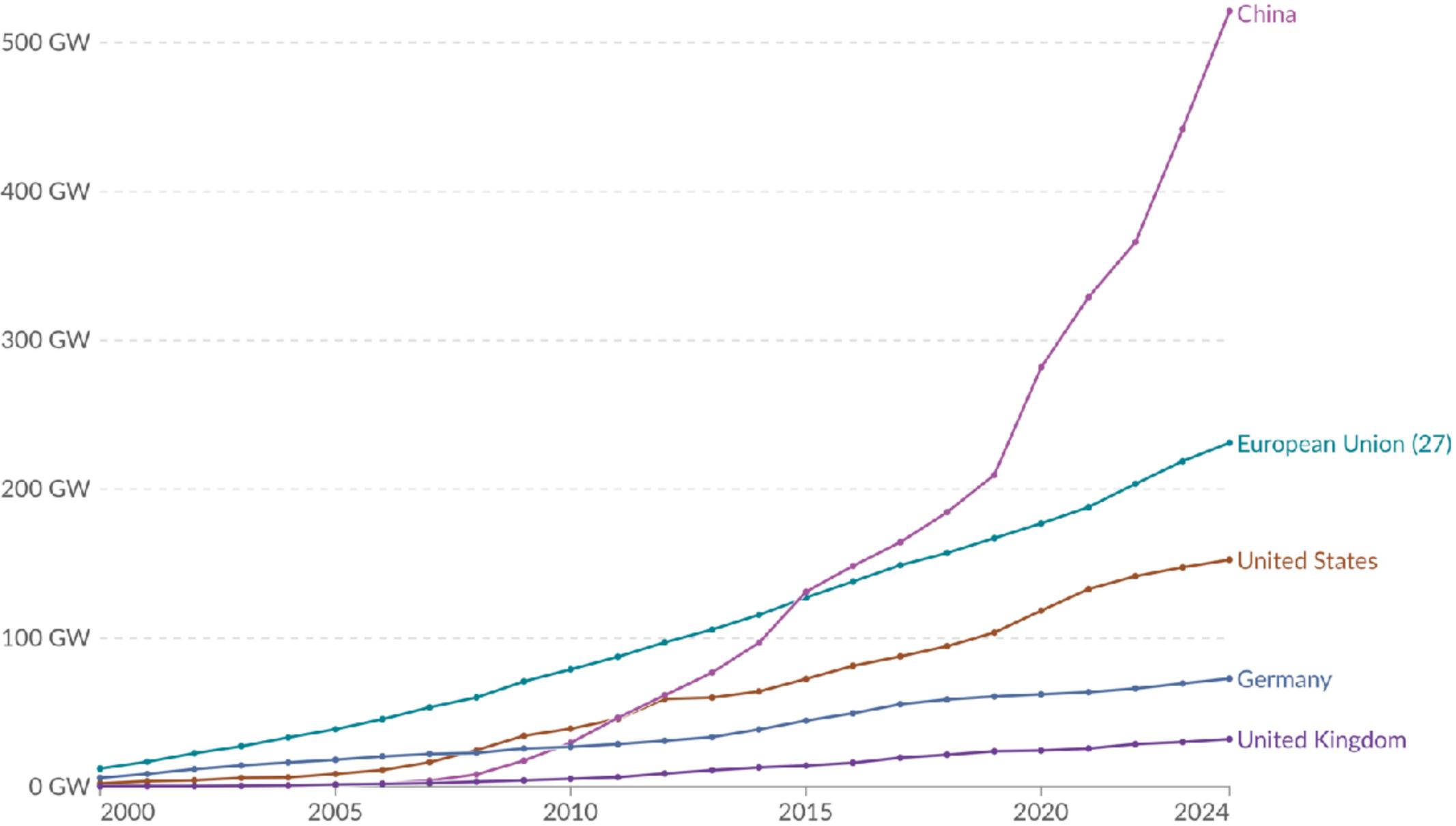
# 4. Which country generates the most wind energy?

## Installed wind energy capacity



Cumulative installed wind energy capacity including both onshore and offshore wind sources, measured in gigawatts (GW).

### b) China



Data source: IRENA (2025)

# 2023 U.S. Land-Based Wind Energy Capacity

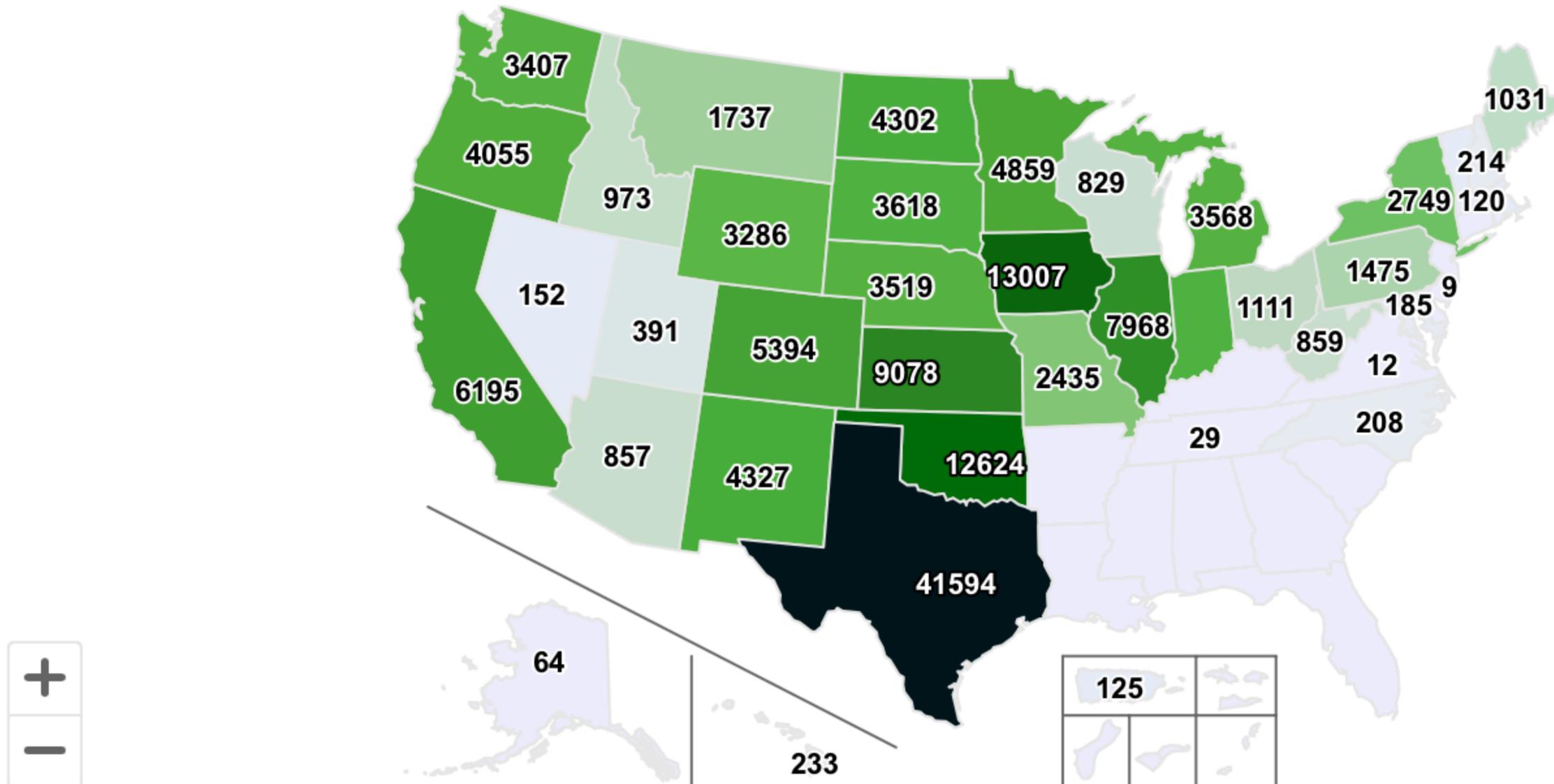
This map shows land-based wind energy capacity at the end of 2023 (and amount added during 2023) in megawatts in the United States by state or territory.

Megawatts



0 10k 20k 30k 40k 5...

## MEANWHILE, IN TEXAS...



**5. Very Roughly how much would it cost to get solar panels on the roof of a typical UK house (just panels, no batteries)?**

**a) £15000**

**b) £8000**

**c) £2000**

**d) They are free with a Government grant**

**5. Very Roughly how much would it cost to get solar panels on the roof of a typical UK house (just panels, no batteries)?**

**b) £8000**

Source - CheckaTrade. Prices quoted vary from about £5 to £8k from supplier websites

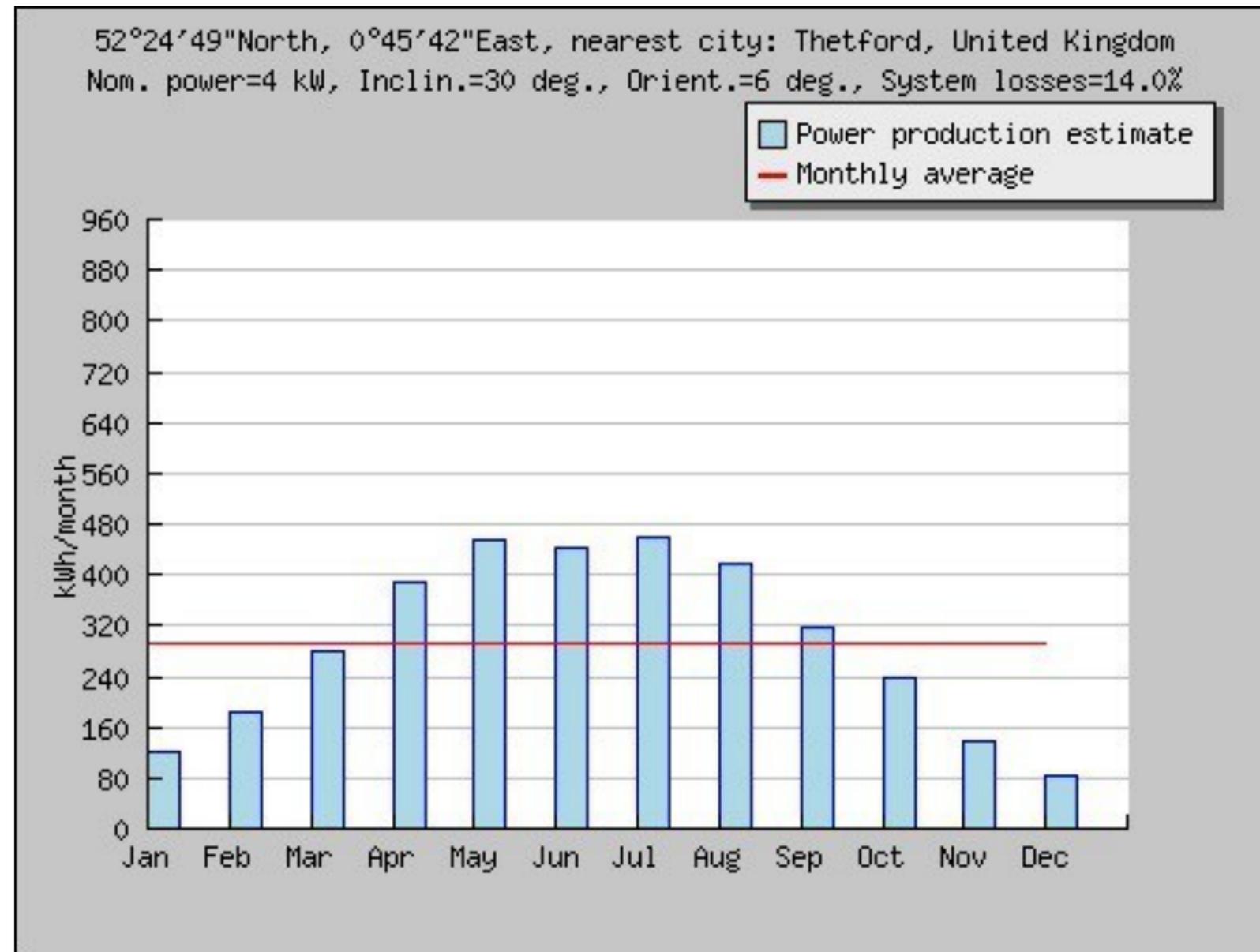
Payback is about 6-8 years (most suppliers claim this) 10Wh battery, £7k Similar payback to the solar panels

**6. Those lovely sales people claim that solar panels ‘*work even when it’s cloudy, and in winter*’. Is this true?**

- a) No. It it has to be sunny, hence ‘solar panels’.**
- b) Yes. They are just the same, rain or shine, summer or winter.**
- c) *Partially* true. They produce far more electricity when it’s sunny, and in summer, than they do in winter.**
- d) Whatever sales people say, is invariably true. We have laws you know.**

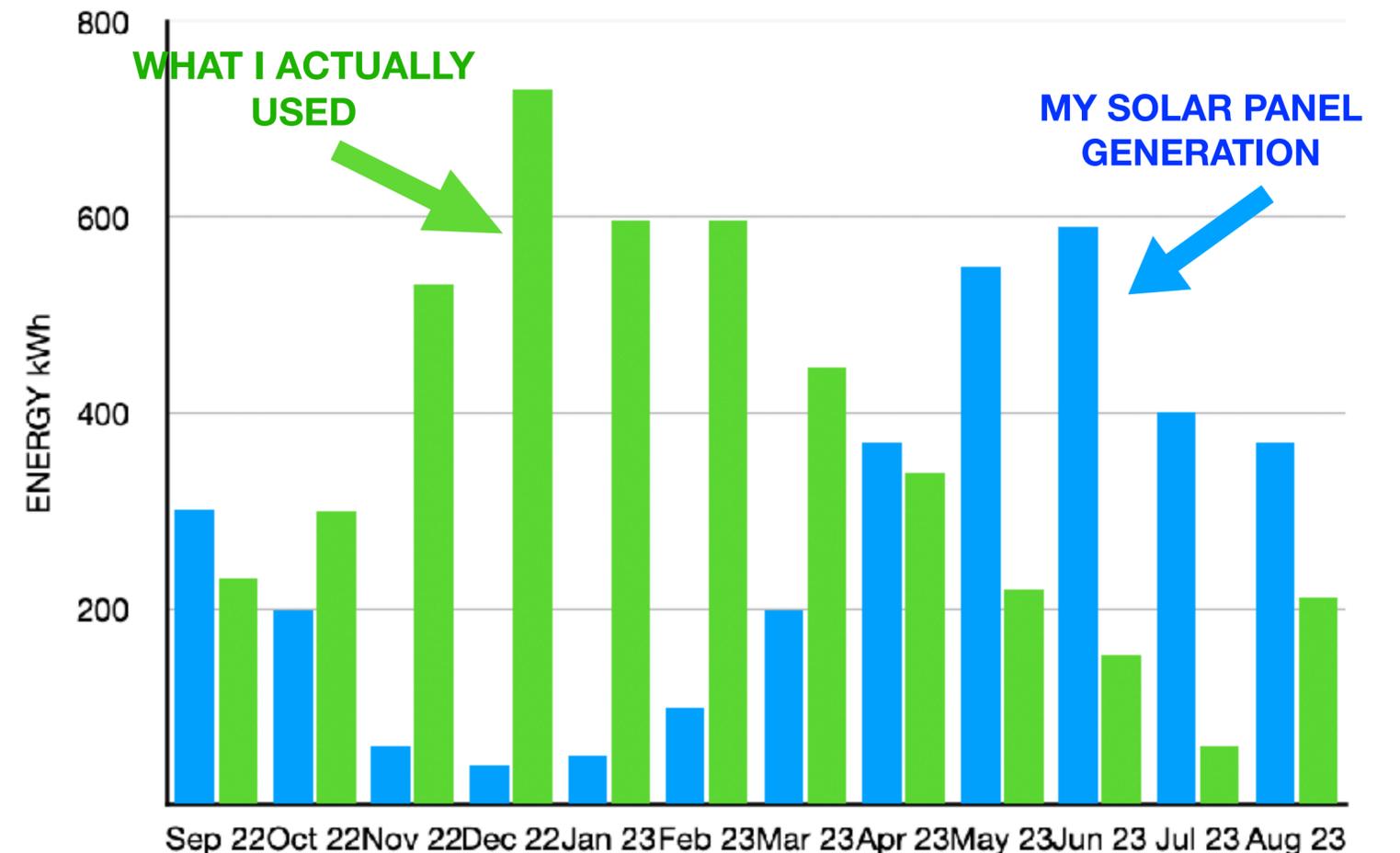
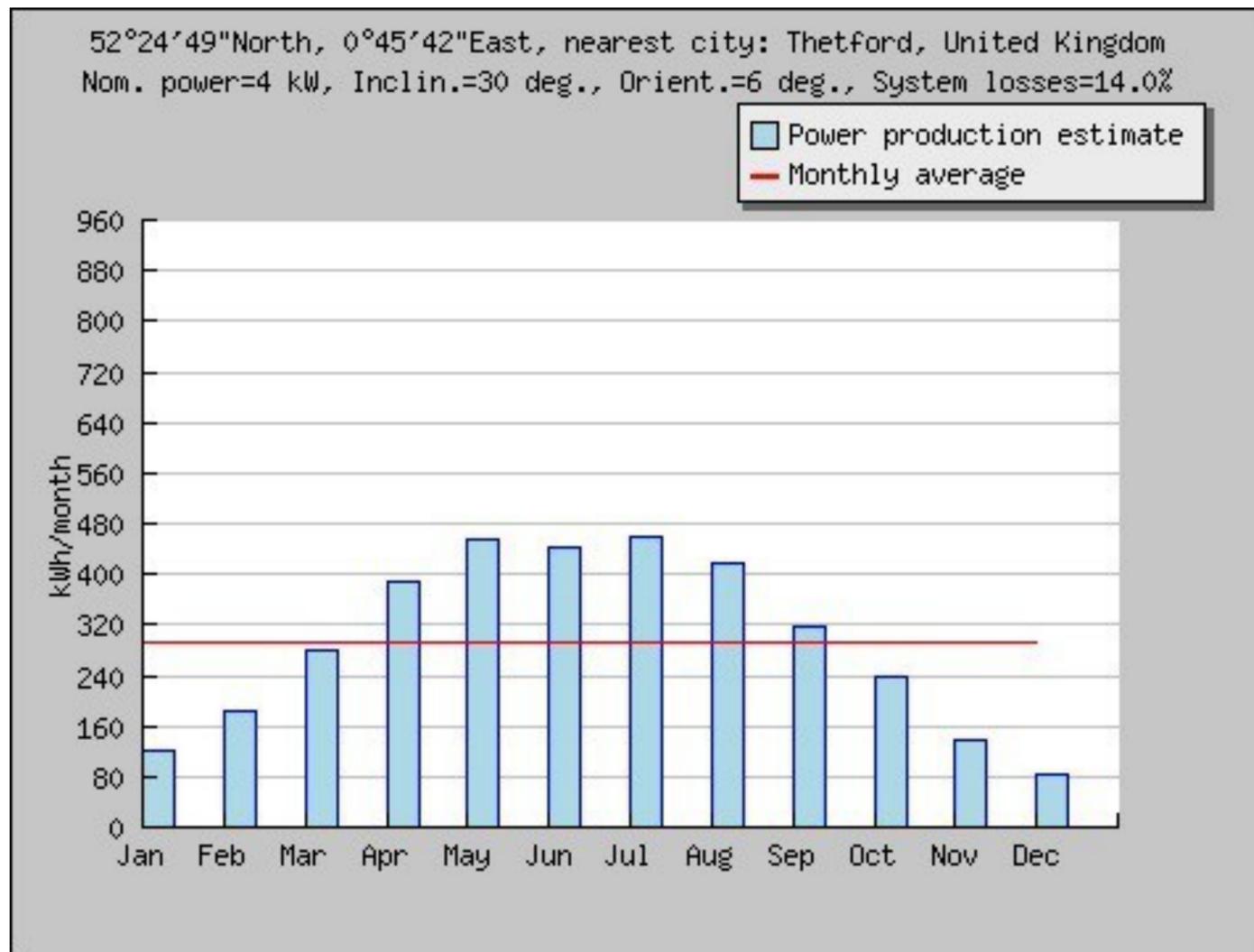
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c) *Partially* true. They produce far more electricity when it's sunny, and in summer, than they do in winter.



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**7. There is much talk about 'efficiency' when it comes to wind and solar. Still on solar panels then - how 'efficient' is the typical modern domestic solar panel? (Clue - in the year 2000 they were about 15% efficient)**

**a) About 30%**

**b) About 22%**

**c) Nearly 100%**

**d) I have no idea, so let's say 50%**

**7. There is much talk about ‘efficiency’ when it comes to wind and solar. Still on solar panels then - how ‘efficient’ is the typical modern domestic solar panel? (Clue - in the year 2000 they were about 15% efficient)**

**b) About 22%**

There’s also a ceiling on the efficiency of most panels, as the theoretical efficiency limit of single-layered solar panels – which describes all modern solar panels installed on homes – is 33.7%.

Also, efficiency doesn’t really matter, The price has dropped 90% over the last twenty years.

**8. Not strictly the UK, but what percentage of GLOBAL land area would be required to be covered in solar panels power the whole world?**

**a)50%**

**b)20%**

**c)5%**

**d)Less than 1%**

**8. Not strictly the UK, but what percentage of GLOBAL land area would be required to be covered in solar panels power the whole world?**

**d) Less than 1%**      **According to 'Carbon Tracker' website, about 0.3% of global land area**

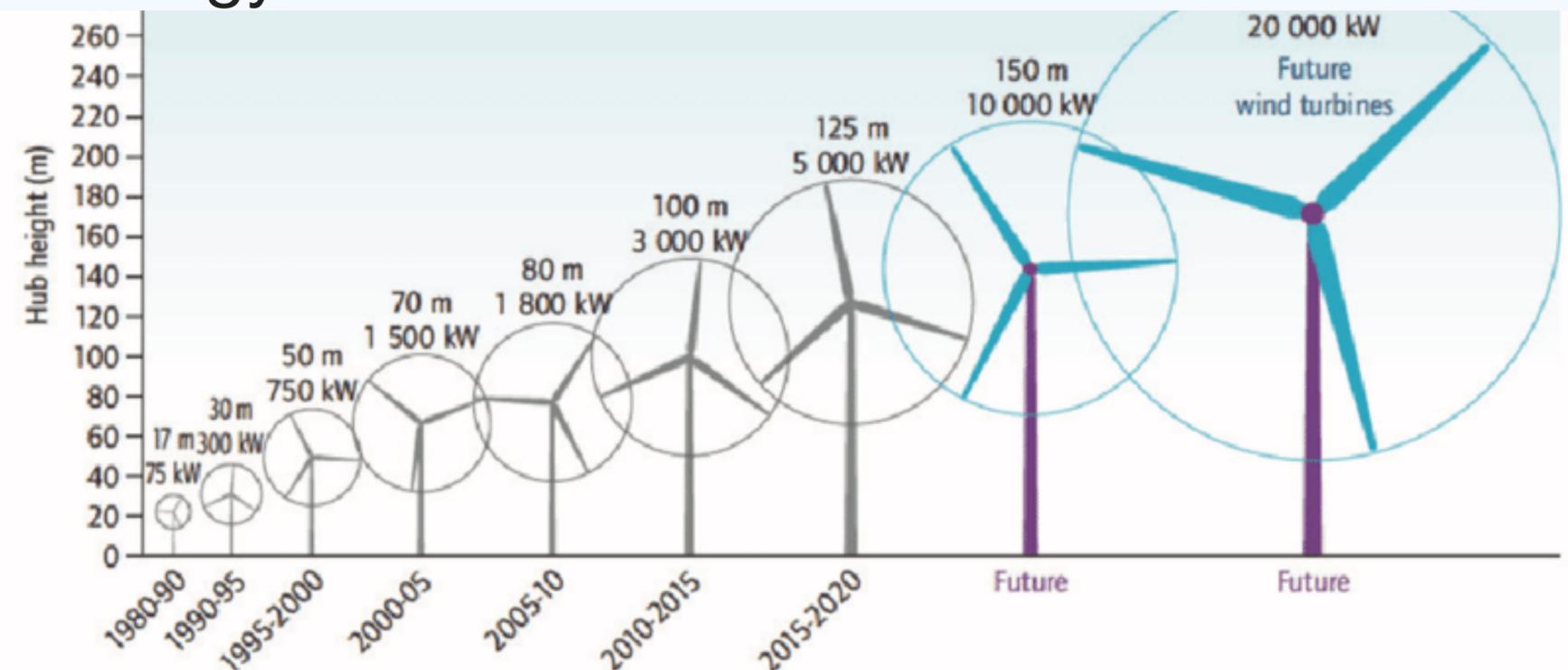
**9. Wind Turbines now, the same question - how 'efficient' is a modern wind turbine?**

- a). About 5%**
- b). About 70%**
- c). About 40%**
- d). About 59.3%**

**9. Wind Turbines now, the same question - how 'efficient' is a modern wind turbine?**

- a).
- b).
- c). **About 40%. Irrelevant really - what were you going to use the spare wind for?**
- d).

The maximum theoretical efficiency of a wind turbine, known as the Betz limit, is approximately 59.3%. This means that no wind turbine can convert more than this percentage of the kinetic energy from the wind into mechanical or electrical energy.



**10. Which country in the world has the most installed wind capacity?**

- a) The UK**
- b) The USA**
- c) China**
- d) Japan**

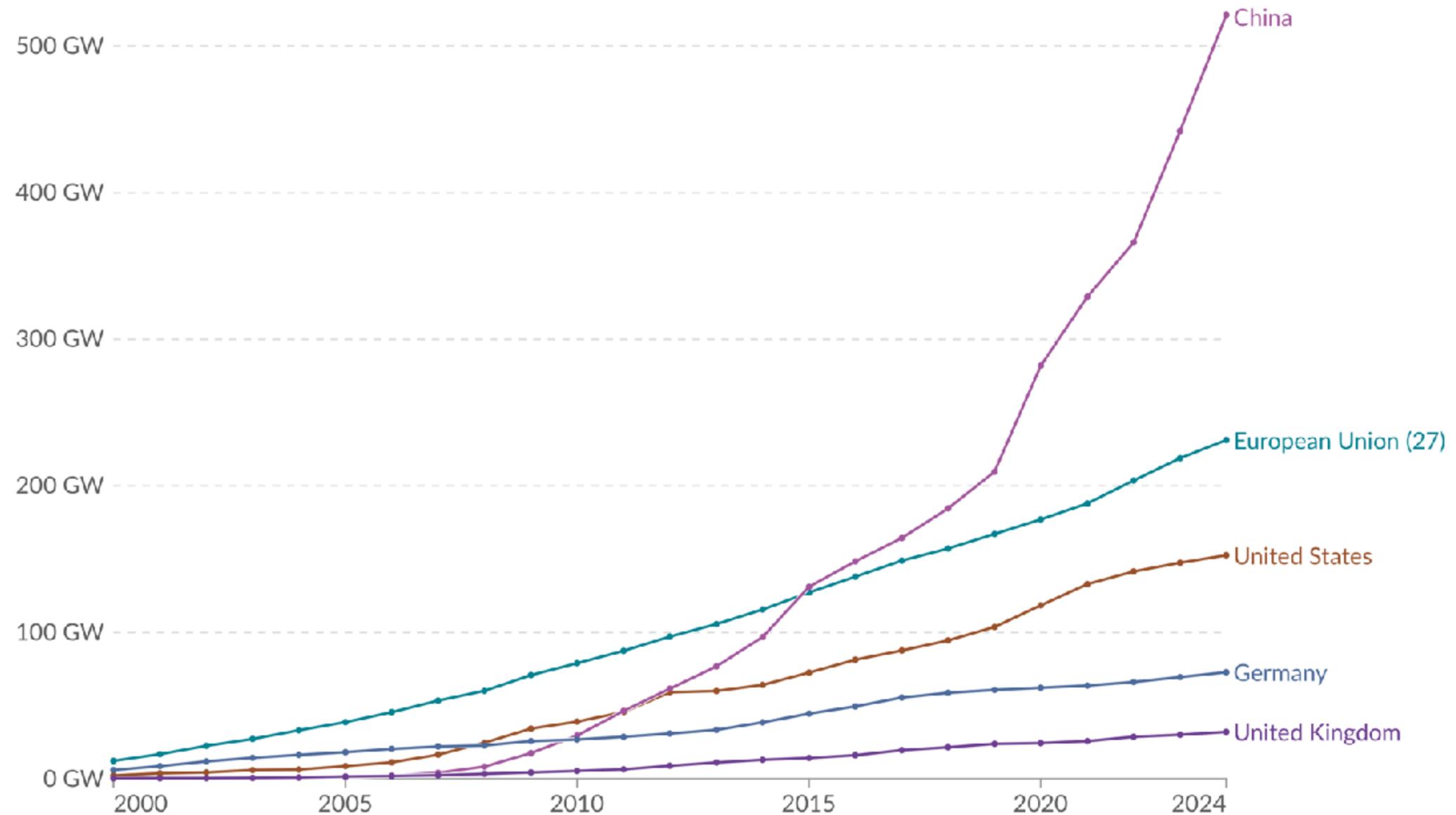
# 10. Which country in the world has the most installed wind capacity?

- a)
- b)
- c) **China**
- d)

## Installed wind energy capacity



Cumulative installed wind energy capacity including both onshore and offshore wind sources, measured in gigawatts (GW).



Data source: IRENA (2025)

OurWorldinData.org/renewable-energy | CC BY

**Quiz 4. What do you know  
about Global Warming?**

# What do you know about GLOBAL WARMING?

**1. Just supposing I was interested in Global Warming, or Climate Change, the best place to start to find out about it would be -**

- a) One of the many conspiracy theory websites
- b) Facebook
- c) Greening Wadsworth meetings
- d) Here: <https://www.ipcc.ch/>

# What do you know about GLOBAL WARMING?

**1. Just supposing I was interested in Global Warming, or Climate Change, the best place to start to find out about it would be -**

- a)
- b)
- c) Greening Wadsworth meetings.                      Half a point!
- d) Here: <https://www.ipcc.ch/>

## **2. What do the letters 'IPCC' stand for?**

- a) Institute of Professional Clever Climatologists?
- b) International Probability of Climate Change?
- c) Intergovernmental Panel on Climate Change
- d) I Personally Couldn't Care

## 2. What do the letters 'IPCC' stand for?

- a)
- b)
- c) Intergovernmental Panel on Climate Change
- d)

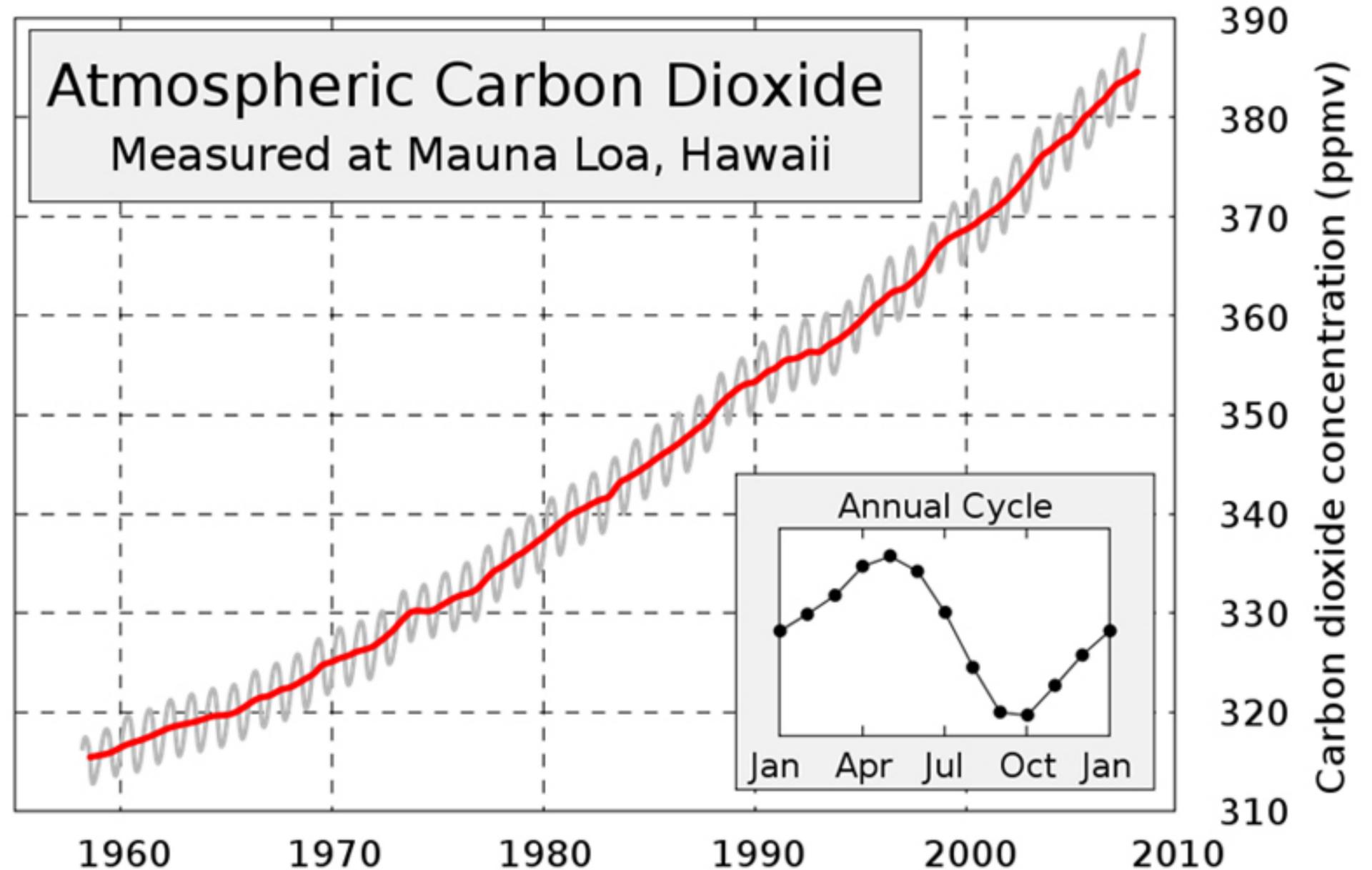
**The IPCC provides regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation**

**3. On the news, they often bang on about the 'CO<sub>2</sub>' level going up, as though it's important, even though it is only measured in *parts per million*. Roughly what was it when Dr Keeling started measuring it in 1958?**

- a) 315 ppm
- b) 10 ppm
- c) 500 ppm
- d) 950 ppm

**3. On the news, they often bang on about the ‘CO2’ level going up, as though it’s important, even though it is only measured in *parts per million*. Roughly what was it when Dr Keeling started measuring it in 1958?**

- a) 315 ppm
- b)
- c)
- d)

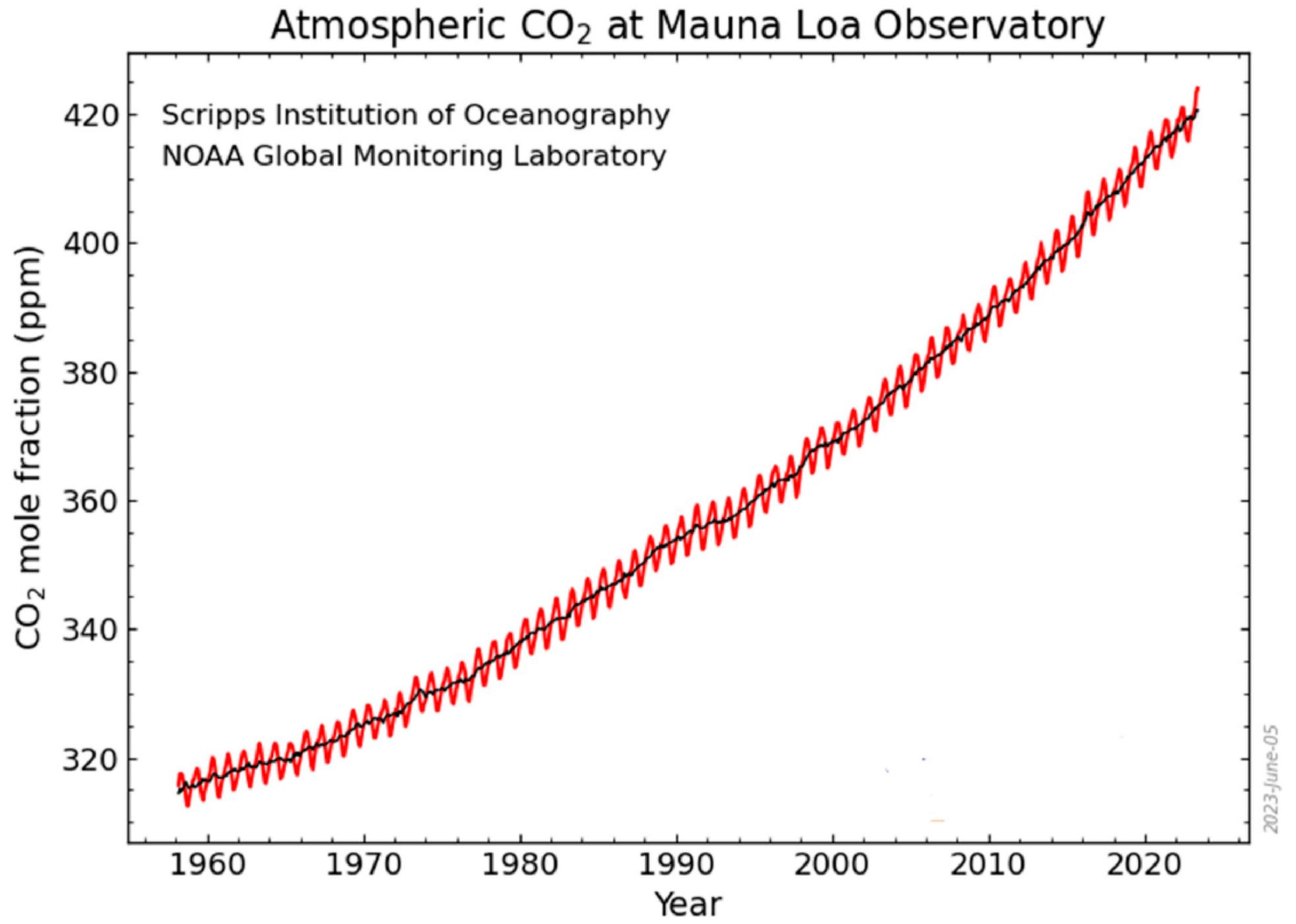


**4. What is the level now?**

- a) 250 ppm
- b) 650 ppm
- c) 1000 ppm
- d) 425 ppm

## 4. What is the level now?

- a)
- b)
- c)
- d) 425 ppm





**5. Right then, supposing it has gone up, whatever the actual number might be. Why would that even matter?**

- a) It doesn't matter. I read that on Facebook.
- b) Because it's a 'Greenhouse Gas', whatever that is.
- c) Because it's carbon dioxide, so it makes the air harder to breath.
- d) The numbers might be wrong, and it hasn't really gone up.

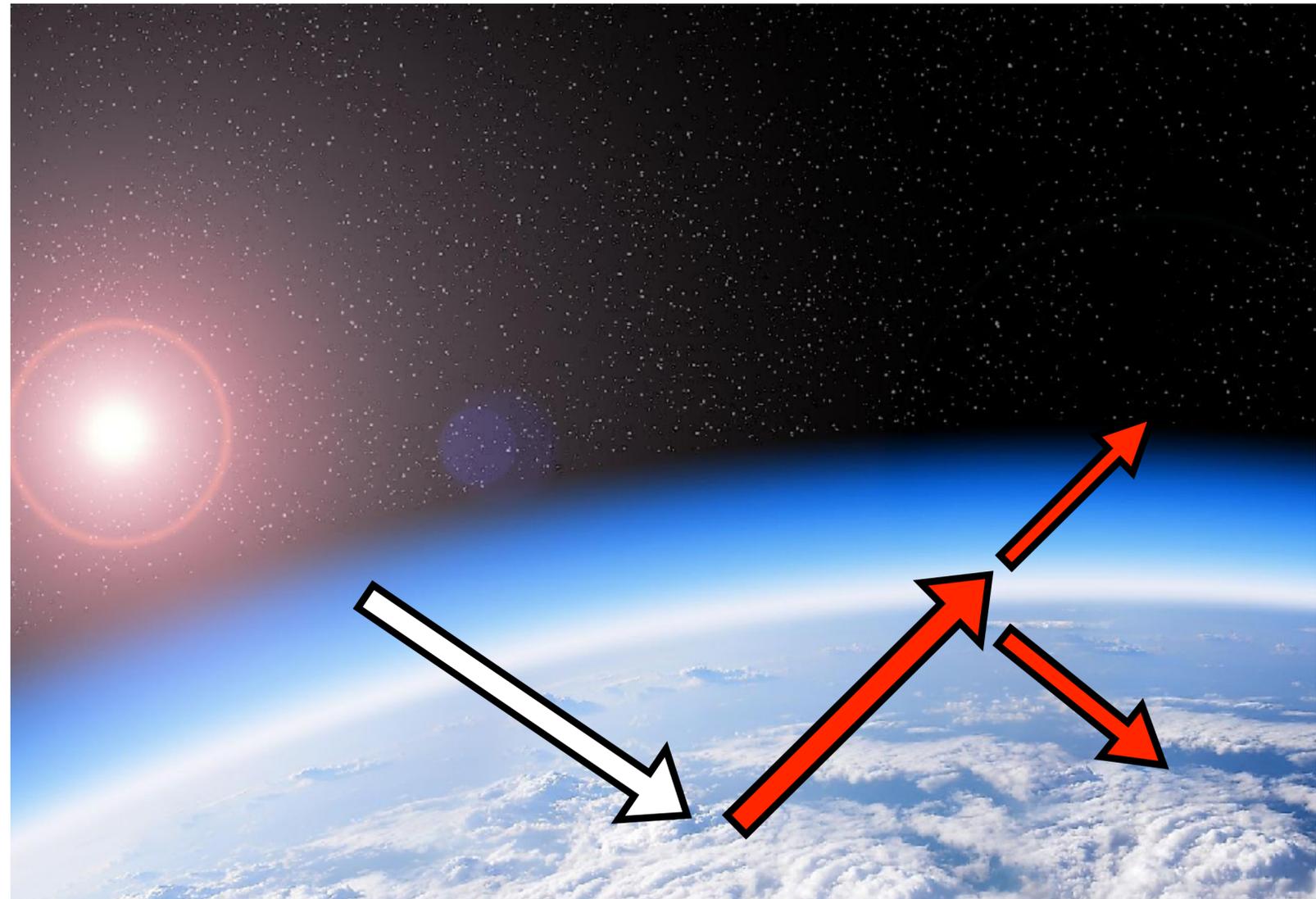
**5. Right then, supposing it has gone up, whatever the actual number might be. Why would that even matter?**

a)

b) Because it's a 'Greenhouse Gas', whatever that is.

c)

d)



**6 The Paris Agreement target of 1.5 degrees C rise threatens us with a ‘Tipping Point’.  
What is a Tipping Point when we talk about Global Warming?**

- a) I have absolutely no idea
- b) The point at which you give the nice politicians a tip for fixing it?
- c) A tip you get from consulting a self-proclaimed expert on Youtube?
- d) The point at which a level is reached from which there's no going back; irreversible changes will have happened. For example, the Antarctic Ice Sheet melts and raises the sea level irreversibly.

**6 The Paris Agreement target of 1.5 degrees C rise threatens us with a 'Tipping Point'. What is a Tipping Point when we talk about Global Warming?**

a)

b)

c)

d) The point at which a level is reached from which there's no going back; irreversible changes will have happened. For example, the Antarctic Ice Sheet melts and raises the sea level irreversibly.

**7. Which of these global processes have been called potential 'Tipping Points'?**

- a) The AMOC stopping / reversing
- b) Antarctic Ice Sheet melting
- c) The tundra permafrost thawing and releasing trapped CO<sub>2</sub>
- d) All of the above

**7. Which of these global processes have been called potential 'Tipping Points'?**

a)

b)

c)

d) All of the above

**8. Maybe you've heard of the 'AMOC', and being told to be scared, very scared, but what is the AMOC and what does it do?**

a) American Members Of Congress

b) Don't believe in it, so it doesn't affect me

c) Atlantic Meridional Overturning Circulation - it regulates the climate in the UK (and parts of Europe), giving us warmer winters.

d) Atlantis, My Only Chance...

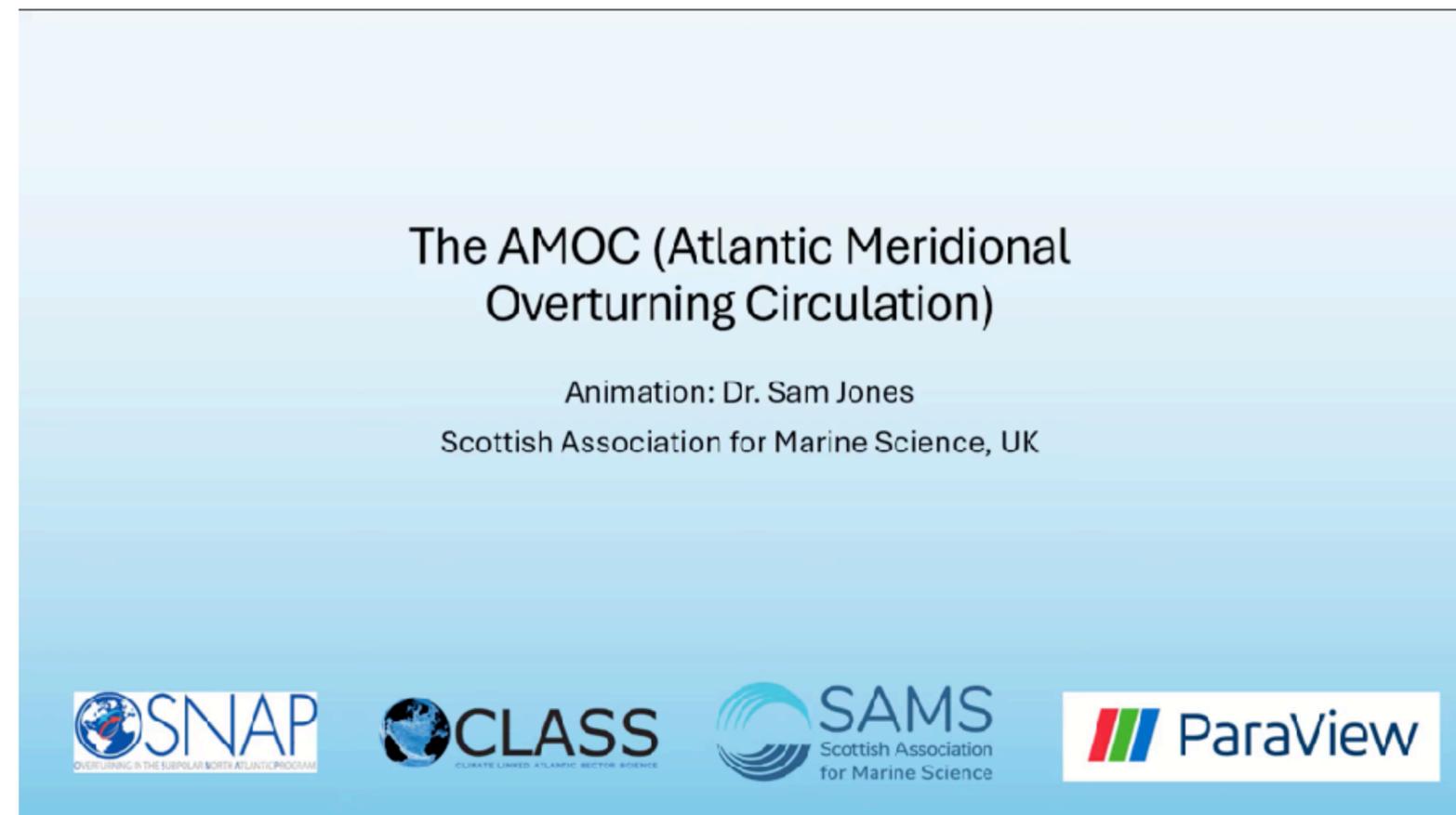
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a)

b)

c) Atlantic Meridional Overturning Circulation - it regulates the climate in the UK (and parts of Europe), giving us warmer winters.

d)



# The AMOC (Atlantic Meridional Overturning Circulation)

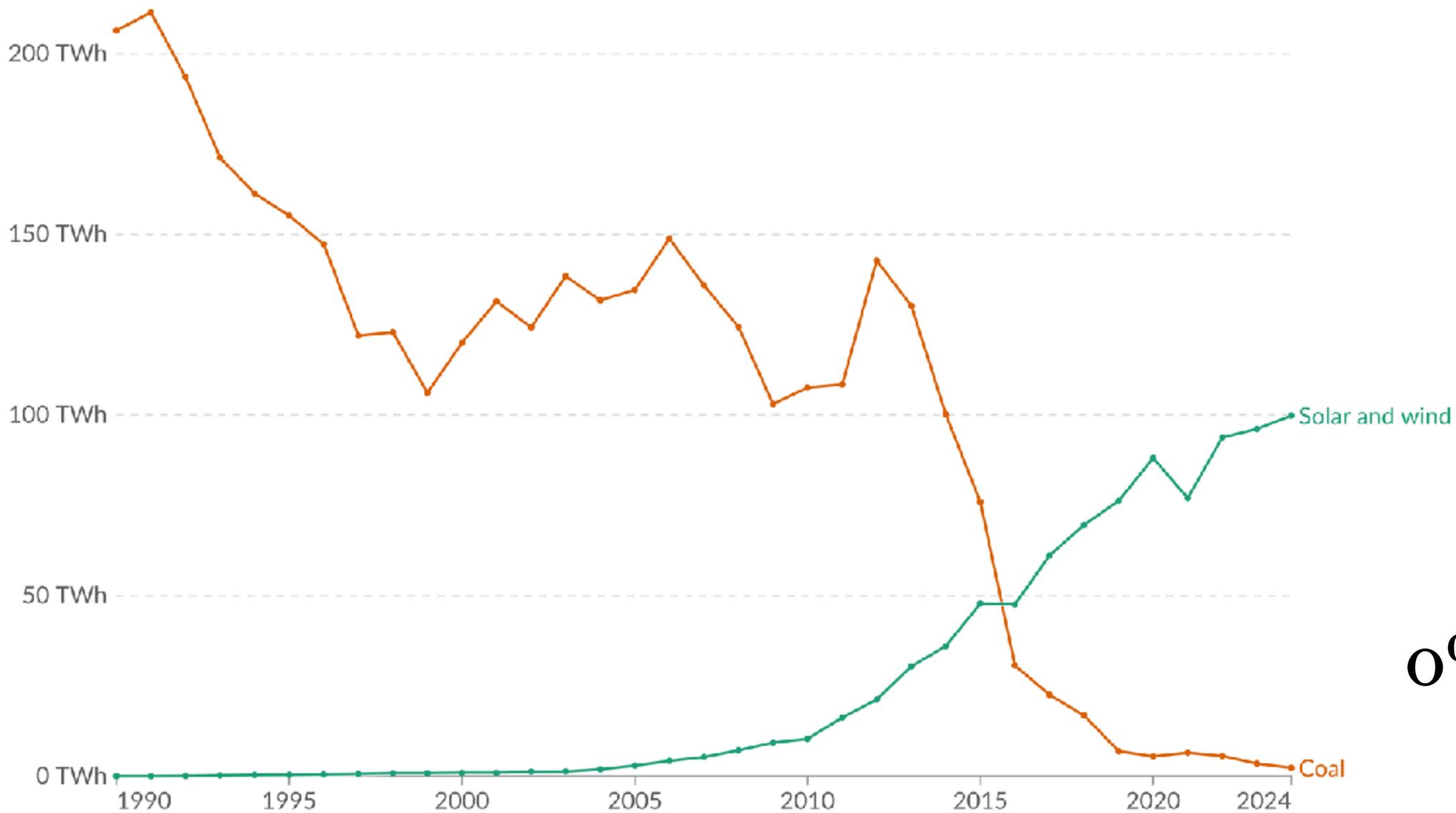
Animation: Dr. Sam Jones

Scottish Association for Marine Science, UK



# Electricity generation from solar and wind compared to coal, United Kingdom, 1990 to 2024

Measured in terawatt-hours<sup>1</sup>.



0% by Jan 2025!

Data source: Ember (2025); Energy Institute - Statistical Review of World Energy (2025)

OurWorldinData.org/electricity-mix | CC BY

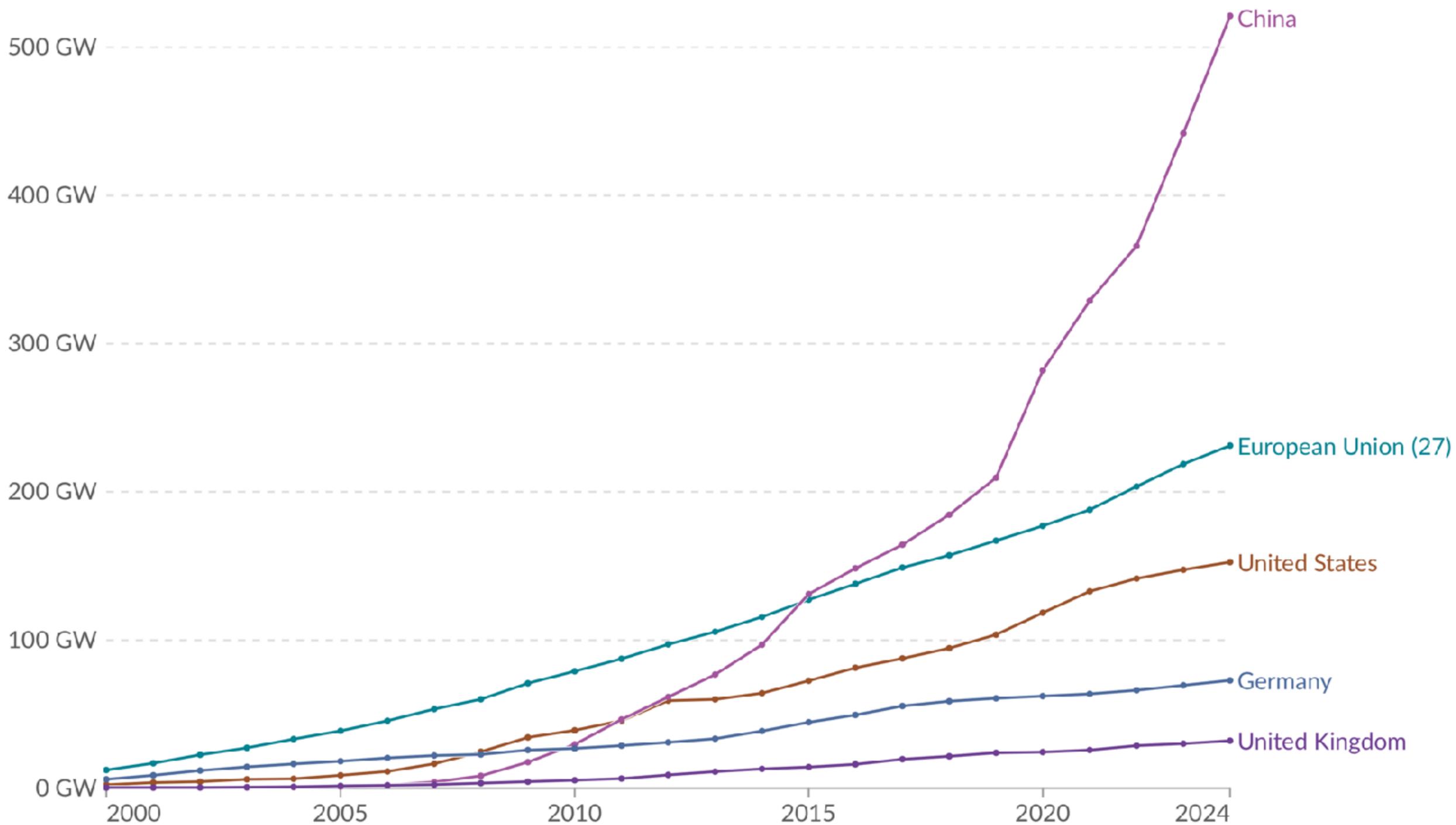
1. **Watt-hour** A watt-hour is the energy one watt of power delivers for one hour. Since one watt equals one joule per second, a watt-hour equals 3600 joules of energy.

Metric prefixes are used for multiples of the unit, usually:

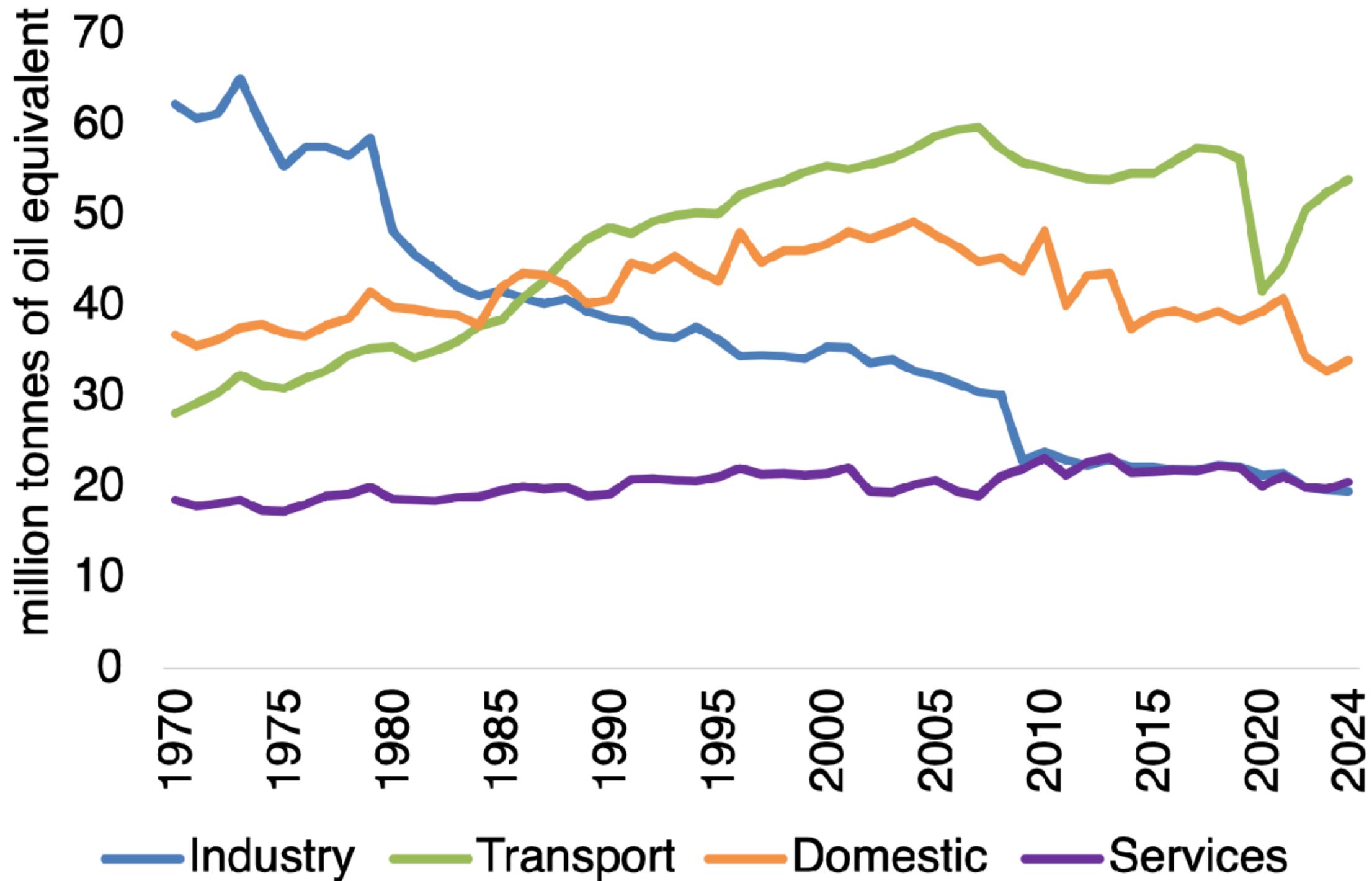
- kilowatt-hours (kWh), or a thousand watt-hours;
- Megawatt-hours (MWh), or a million watt-hours;
- Gigawatt-hours (GWh), or a billion watt-hours;
- Terawatt-hours (TWh), or a trillion watt-hours.

# Installed wind energy capacity

Cumulative installed wind energy capacity including both onshore and offshore wind sources, measured in gigawatts (GW).

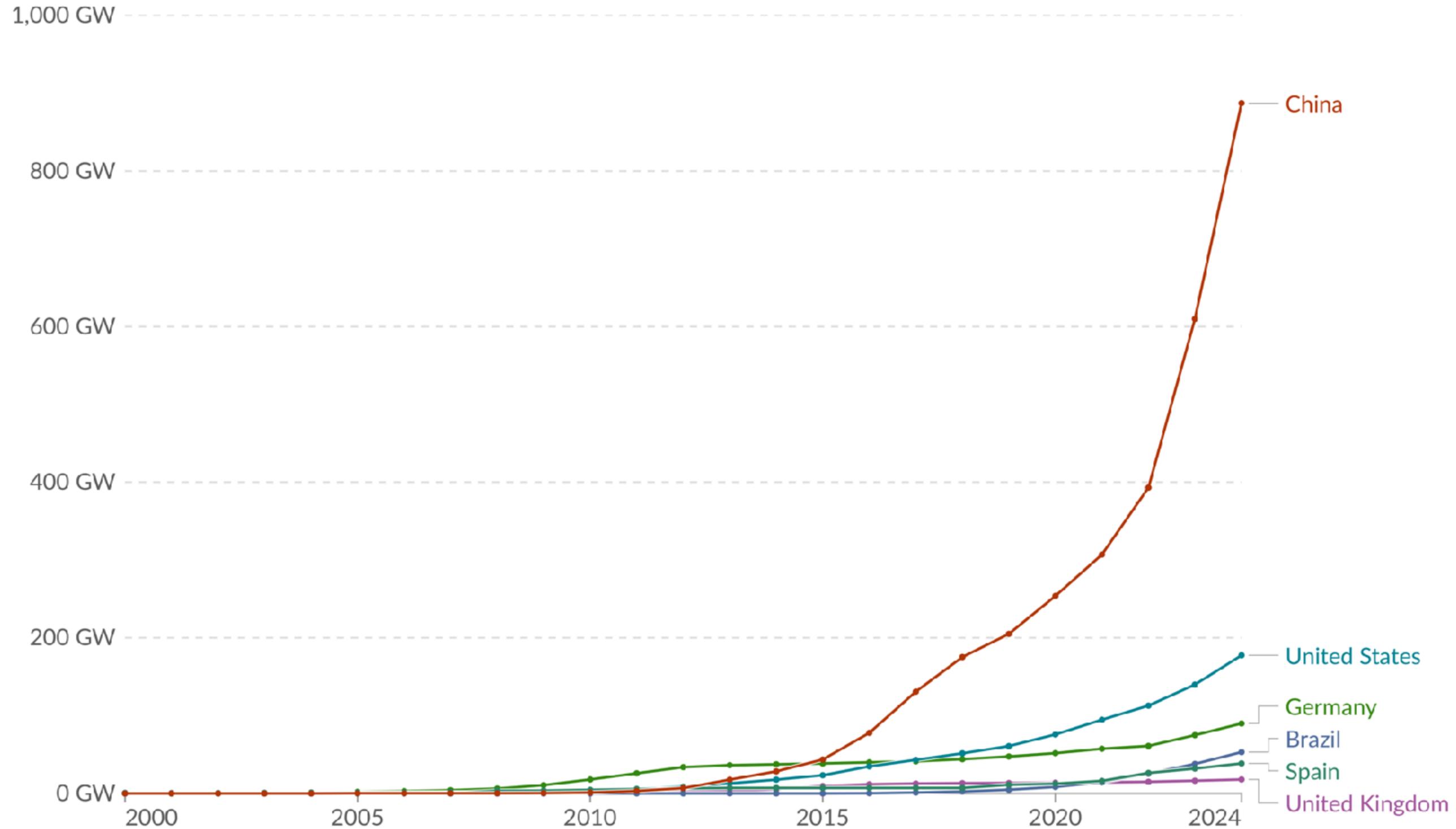


Energy consumption by sector, 1970 to 2024 (Table C1)



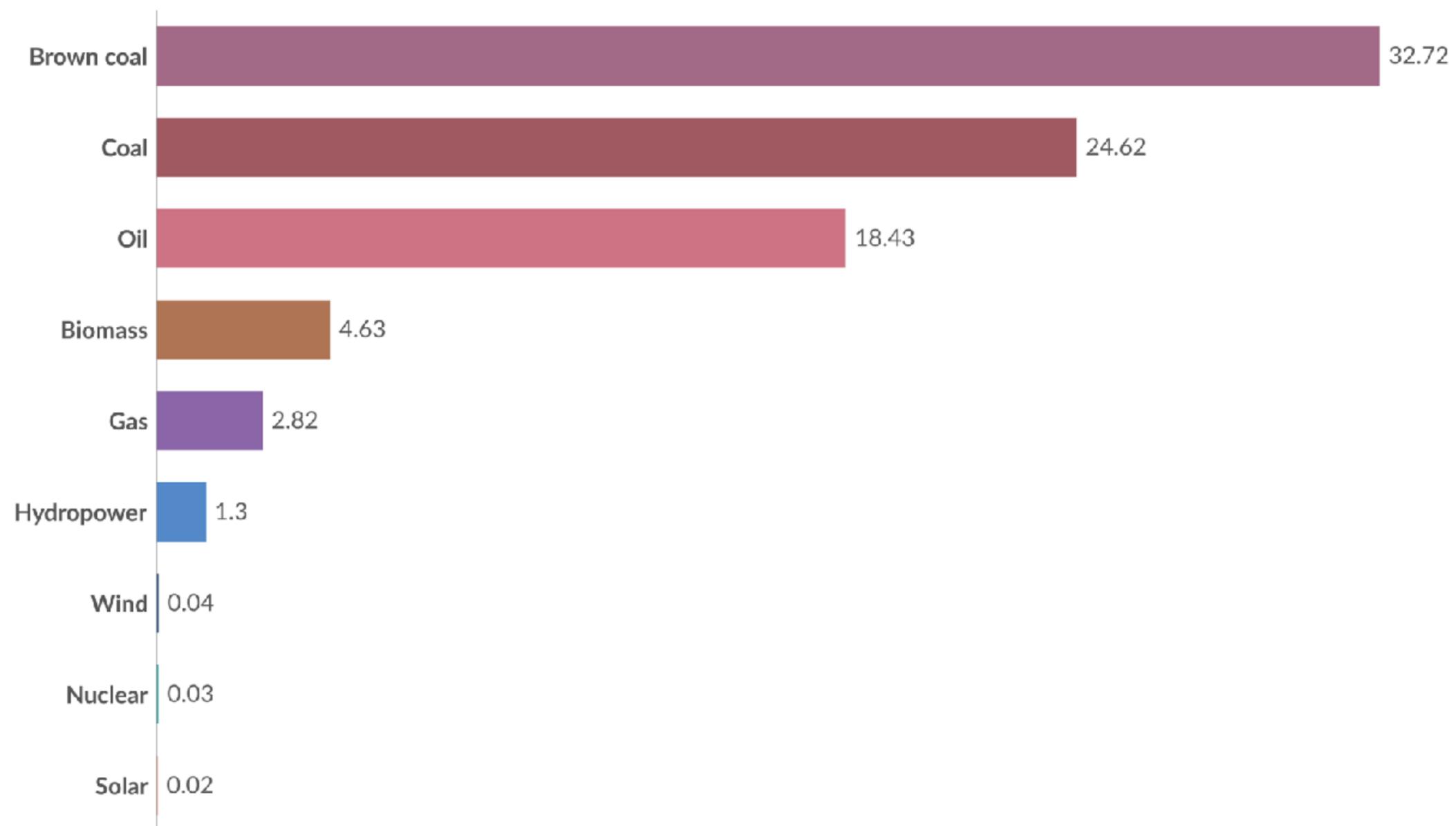
# Installed solar energy capacity

Cumulative installed solar capacity, measured in gigawatts (GW).



# Death rates per unit of electricity production

Death rates are measured based on deaths from accidents and air pollution per terawatt-hour<sup>1</sup> of electricity.



Data source: Markandya & Wilkinson (2007); Sovacool et al. (2016); UNSCEAR (2008; & 2018)

OurWorldinData.org/energy | CC BY

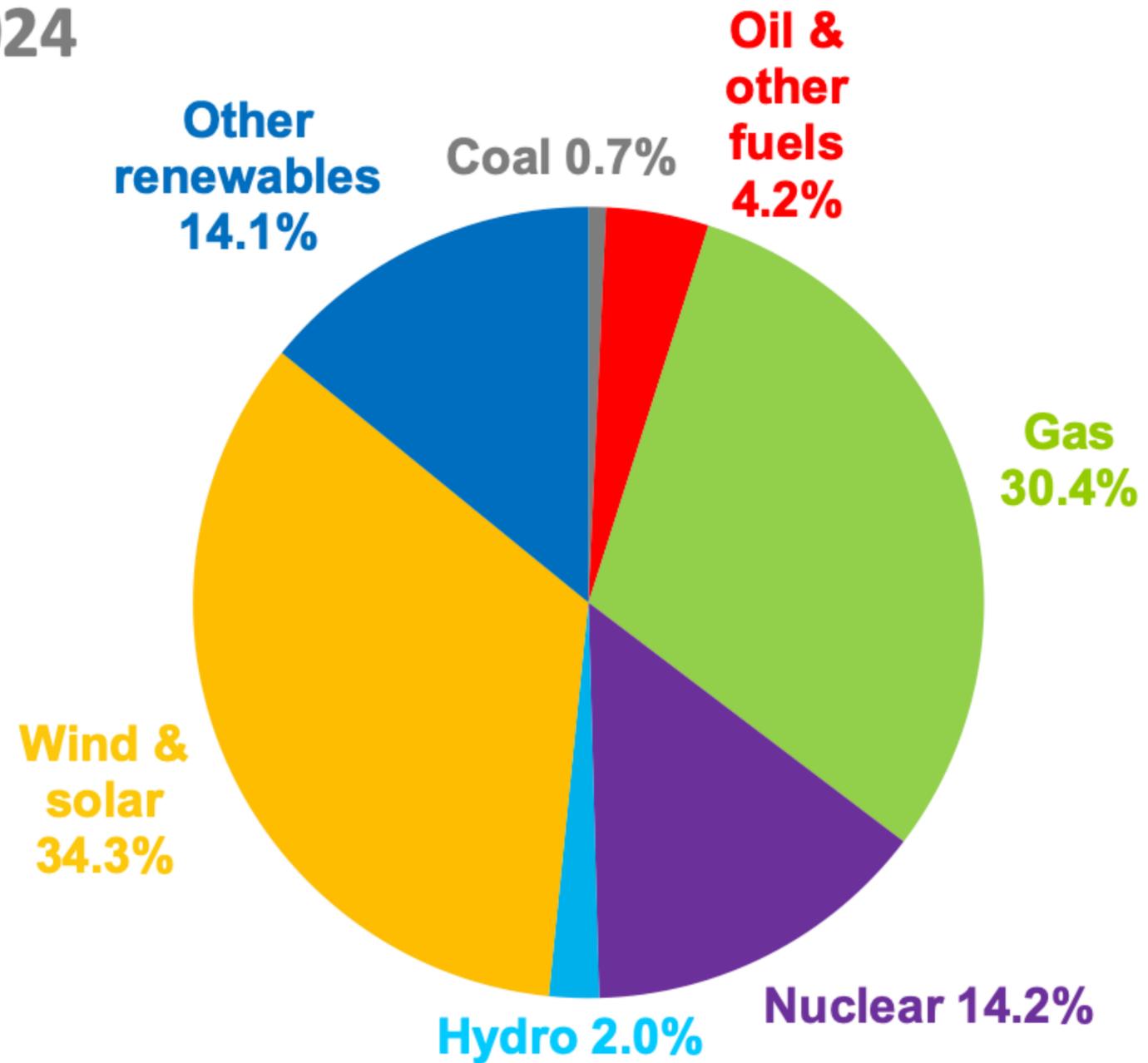
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- Terawatt-hours (TWh), or a trillion watt-hours.

# Electricity generated by fuel type, 2024

2024



# Per capita electricity generation by source, United Kingdom, 2024

Measured in kilowatt-hours<sup>1</sup>. "Other renewables" include geothermal, tidal, and wave generation.

■ Coal ■ Gas ■ Oil ■ Nuclear ■ Hydropower ■ Wind ■ Solar ■ Bioenergy ■ Other renewables



Data source: Ember (2025); Energy Institute - Statistical Review of World Energy (2025); Population based on various sources (2024)

OurWorldinData.org/electricity-mix | CC BY

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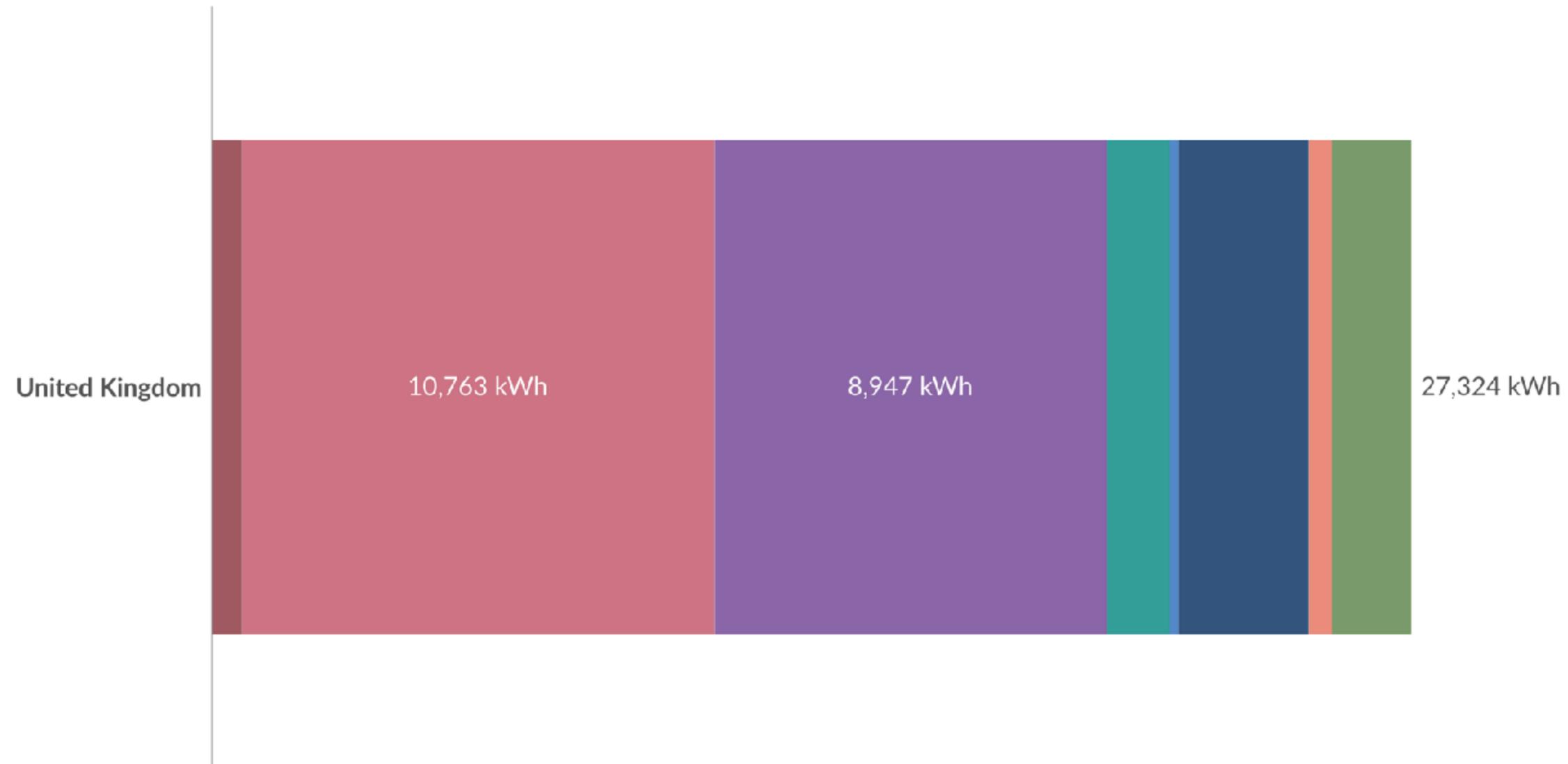
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- Terawatt-hours (TWh), or a trillion watt-hours.

# Per capita primary energy consumption by source, United Kingdom, 2024



Primary energy<sup>1</sup> is measured in kilowatt-hours<sup>2</sup> per person, using the substitution method<sup>3</sup>.

■ Coal ■ Oil ■ Gas ■ Nuclear ■ Hydropower ■ Wind ■ Solar ■ Other renewables



Data source: Energy Institute - Statistical Review of World Energy (2025); Population based on various sources (2024)

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