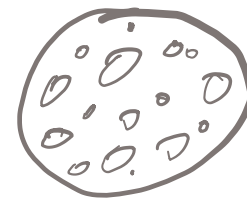
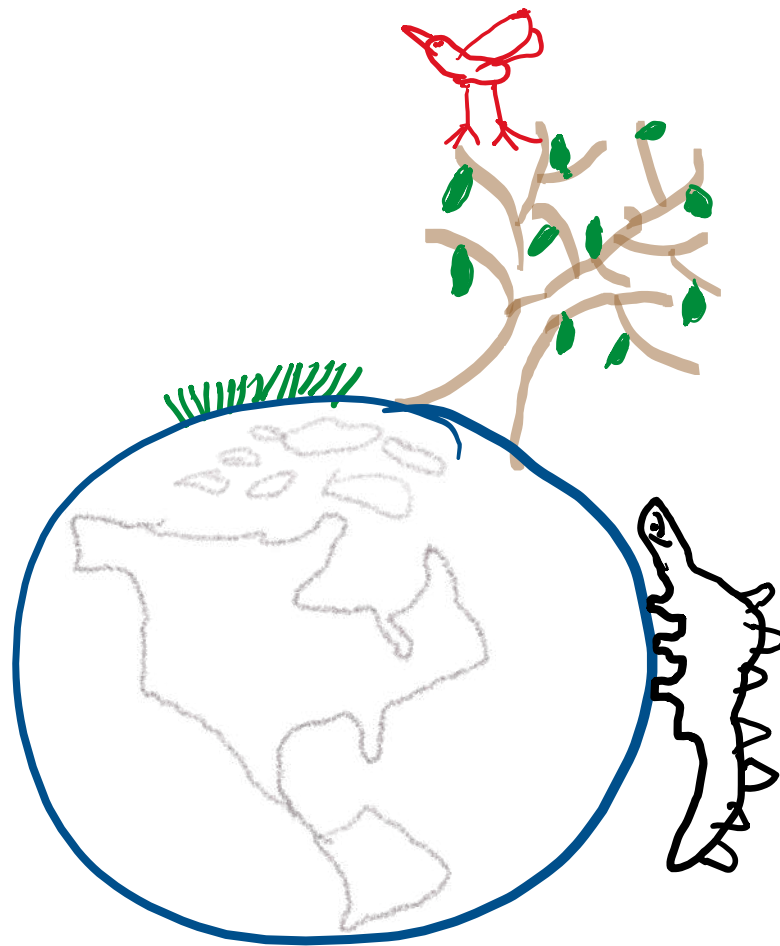
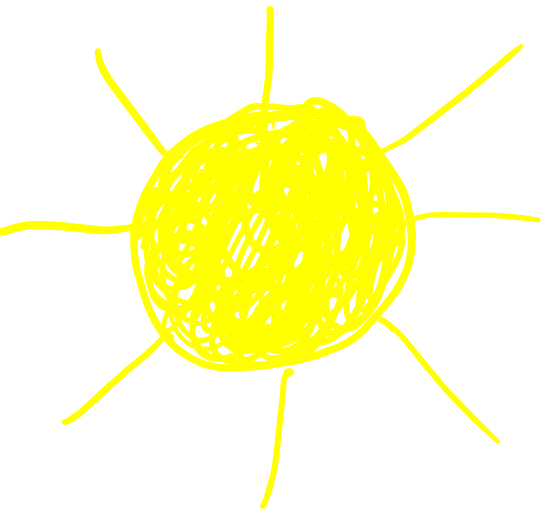


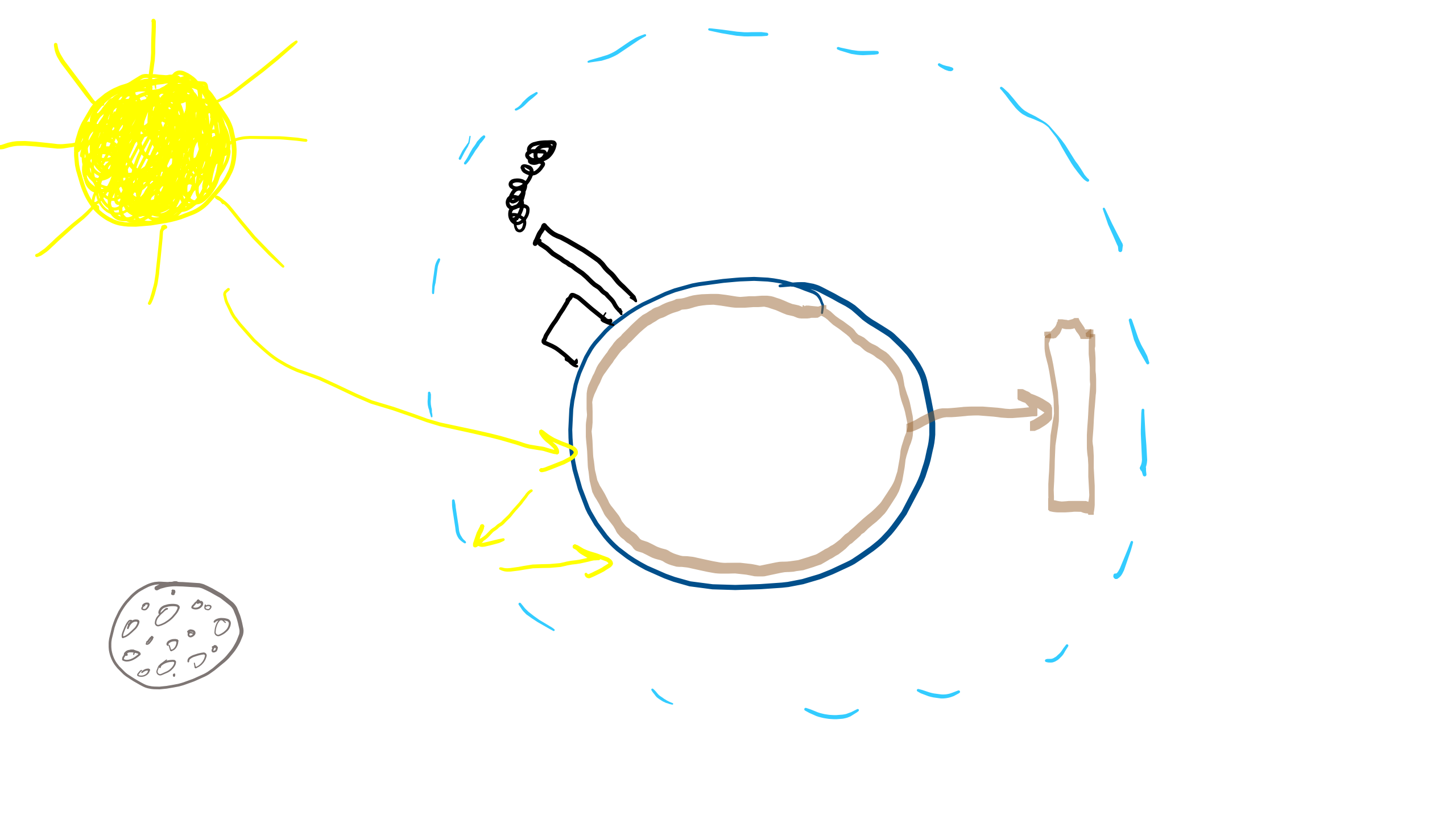


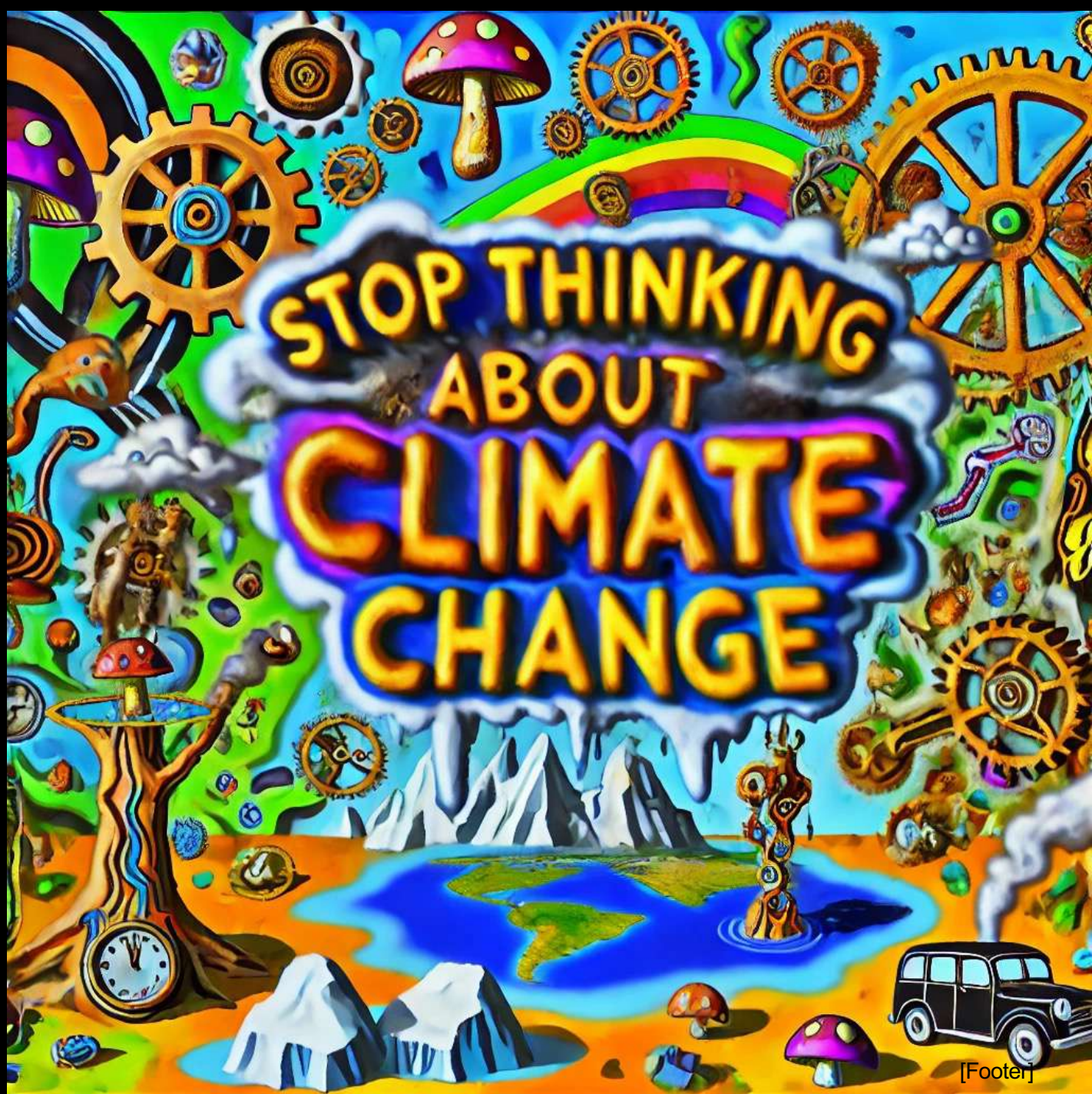
→ Tej Gidda
Global Leader – Future Energy

The World is a Battery.

W e l c o m e

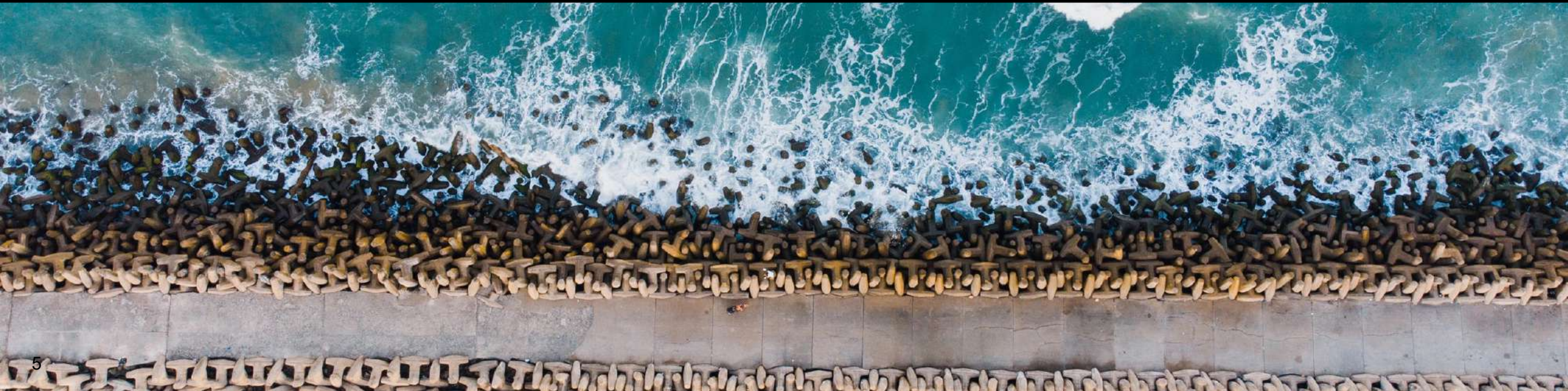




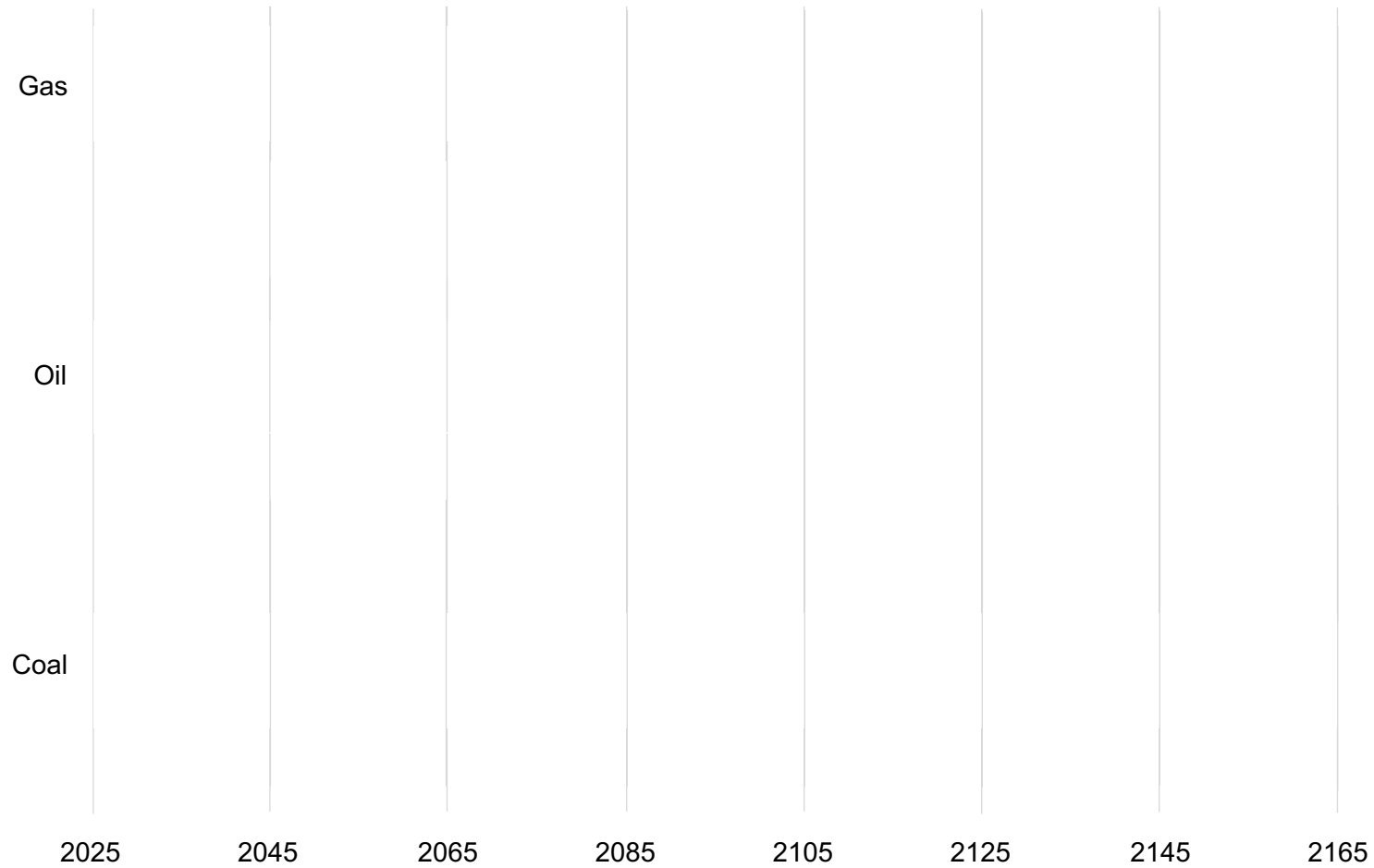


[Footer]

Why energy transition ?



Our Shared Battery



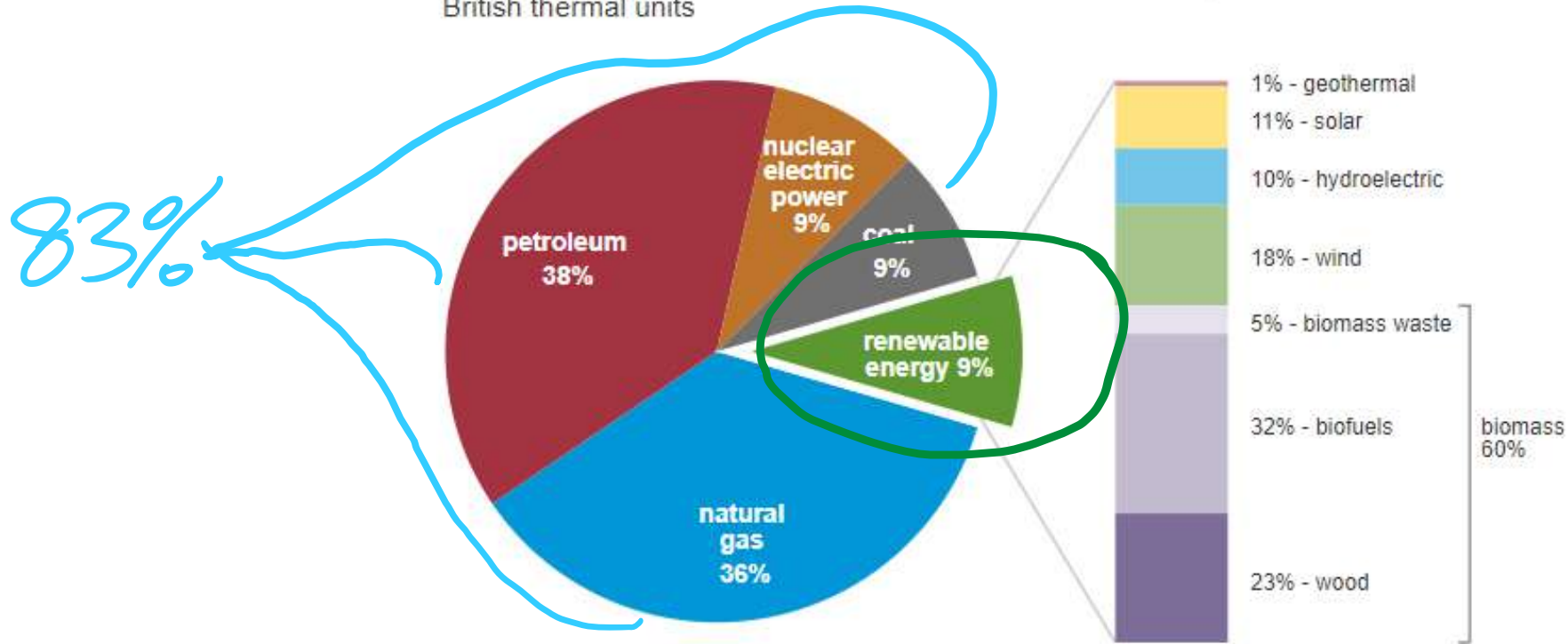
Data Source: Energy Institute – Statistical Review of World Energy (2024)

The US Alone...

U.S. primary energy consumption by energy source, 2023

total = 93.59 quadrillion
British thermal units

total = 8.24 quadrillion British thermal units



Data source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 1.3 and 10.1, April 2024, preliminary data

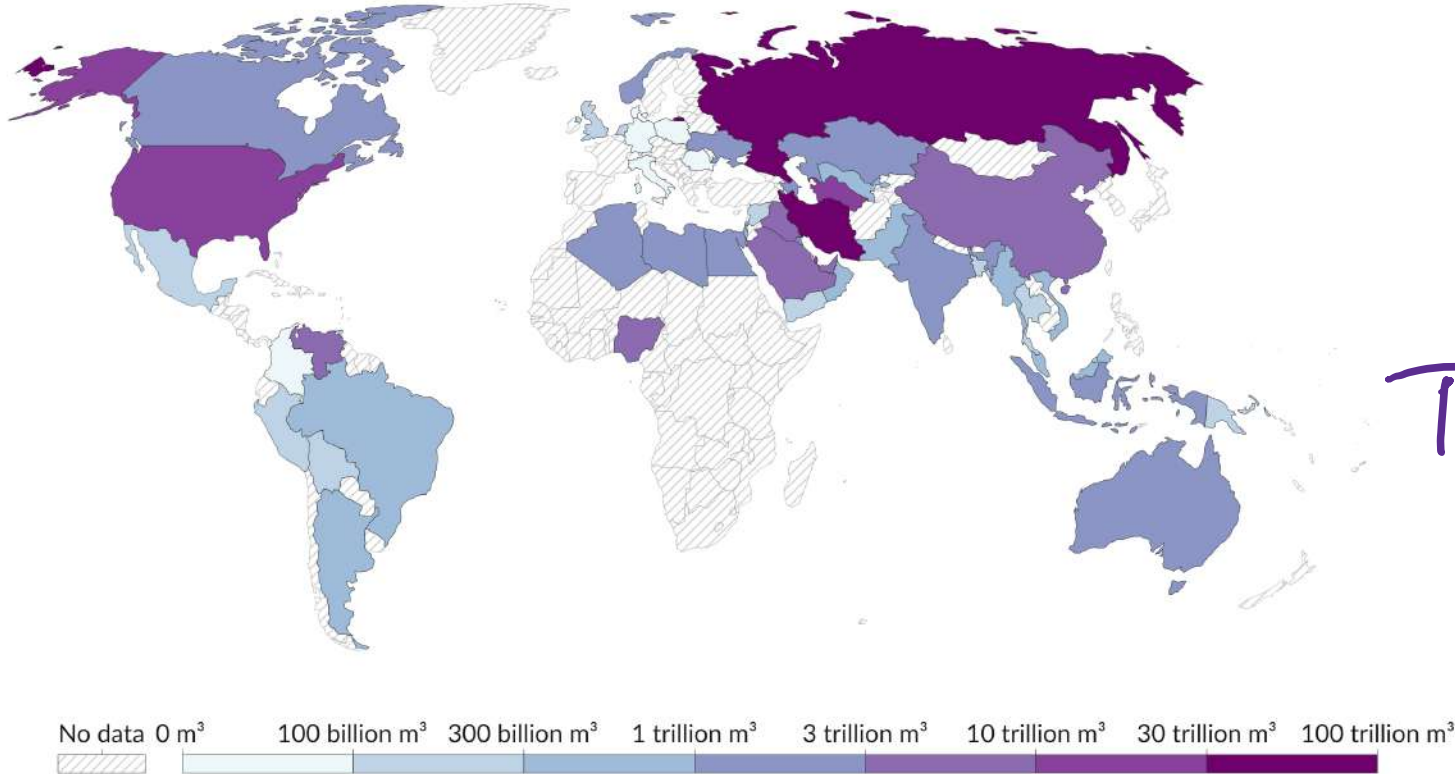


Note: Sum of components may not equal 100% because of independent rounding.

Gas reserves, 2020

Proved reserves, measured in cubic meters, are generally those quantities that can be recovered in the future from known reservoirs under existing economic and operating conditions, according to geological and engineering information.

Our World
in Data



Data source: Energy Institute - Statistical Review of World Energy (2024)

OurWorldInData.org/fossil-fuels | CC BY

Russia - 37 Tn m³
Iran - 32 Tn m³
Qatar - 25 Tn m³
Turkmenistan - 13 Tn m³
US - 12 Tn m³
China - 8 Tn m³

World Oil Production

OIL PRODUCTION IN MILLIONS OF BARRELS PER DAY

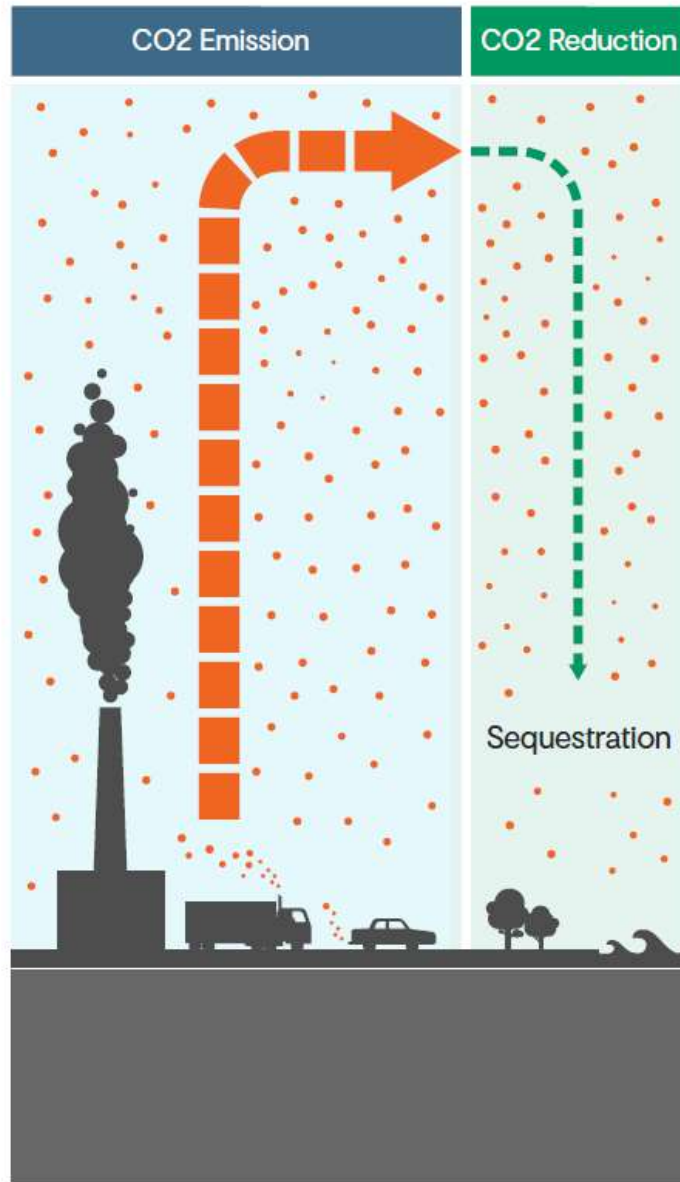


 **TonyMAPPEDit.com**

Data set: 1 January 2019

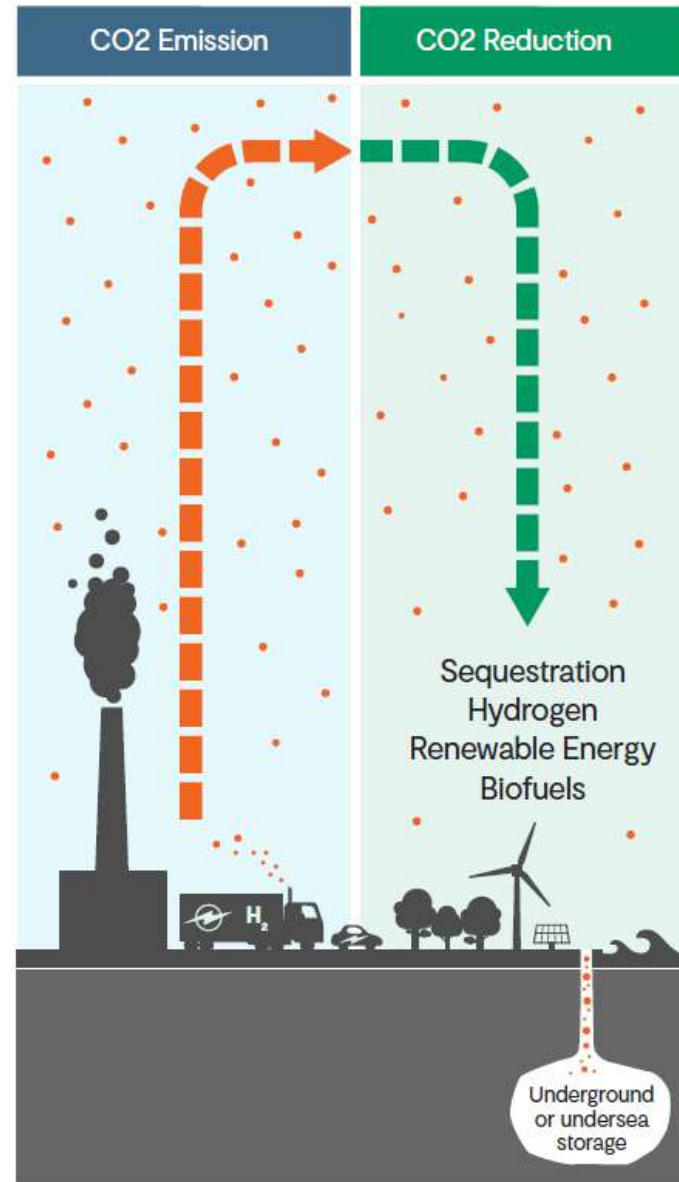
Our Past

Net accumulation of CO2 in atmosphere



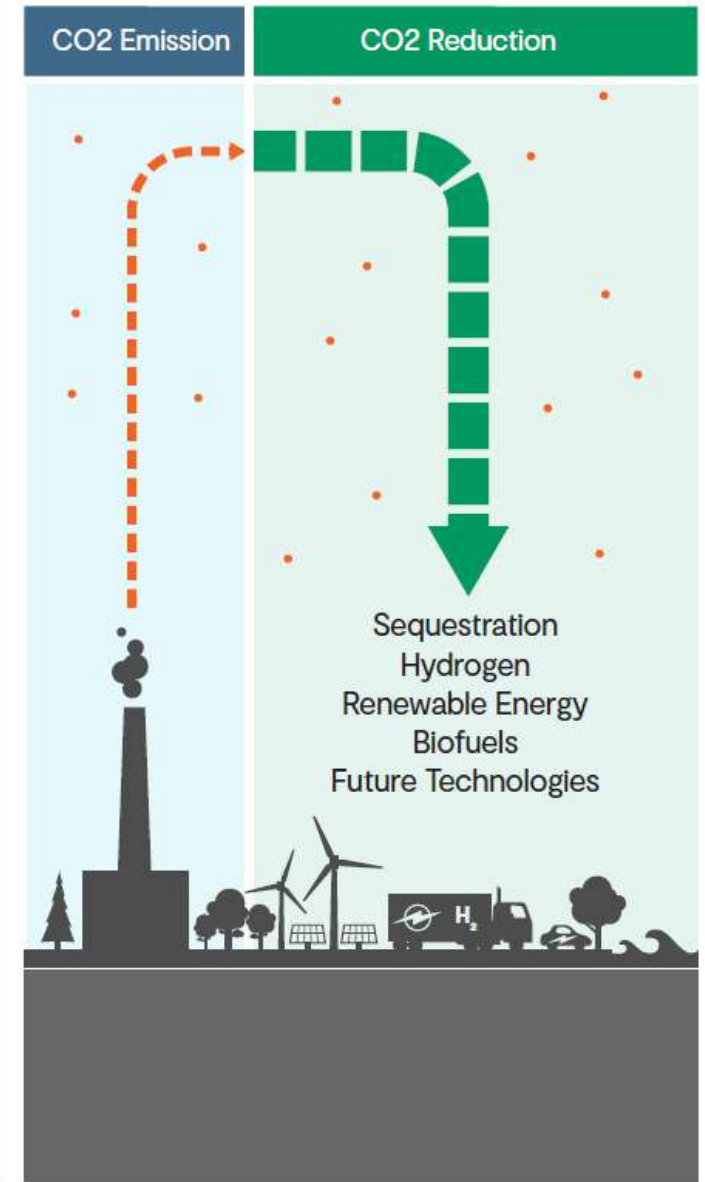
Net-Zero 2050

Balanced emissions and CO2 removal from atmosphere



Future 2050+

Net negative CO2 removal and carbon healing



● Excess carbon dioxide in atmosphere ● Reduction in carbon dioxide in atmosphere

The magic answer must be...

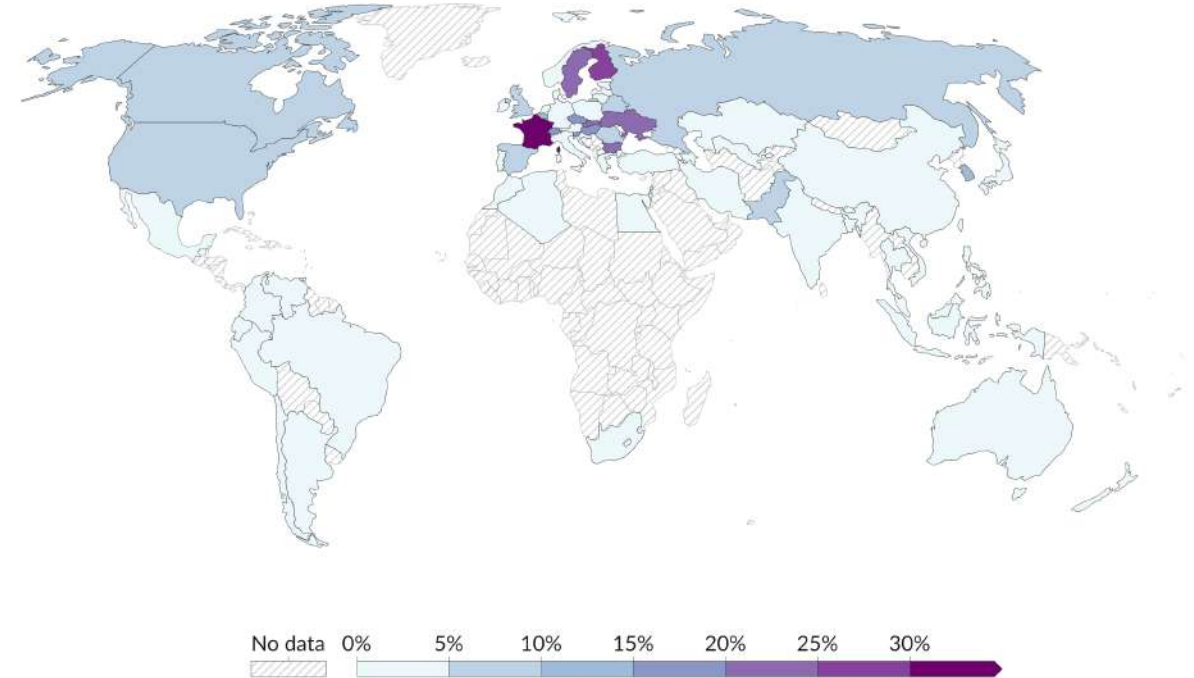
There isn't one.

→ There are many.

Share of primary energy consumption from nuclear, 2023

Measured as a percentage of primary energy¹ using the substitution method².

Our World
in Data



Data source: Energy Institute - Statistical Review of World Energy (2024)

OurWorldInData.org/energy | CC BY

1. Primary energy: Primary energy is the energy available as resources – such as the fuels burnt in power plants – before it has been transformed. This relates to the coal before it has been burned, the uranium, or the barrels of oil. Primary energy includes energy that the end user needs, in the form of electricity, transport and heating, plus inefficiencies and energy that is lost when raw resources are transformed into a usable form. You can read more on the different ways of measuring energy in our article.

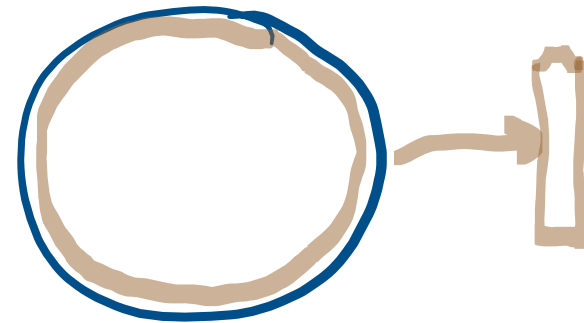
2. Substitution method: The 'substitution method' is used by researchers to correct primary energy consumption for efficiency losses experienced by fossil fuels. It tries to adjust non-fossil energy sources to the inputs that would be needed if it was generated from fossil fuels. It assumes that wind and solar electricity is as inefficient as coal or gas. To do this, energy generation from non-fossil sources are divided by a standard 'thermal efficiency factor' – typically around 0.4 Nuclear power is also adjusted despite it also experiencing thermal losses in a power plant. Since it's reported in terms of electricity output, we need to do this adjustment to calculate its equivalent input value. You can read more about this adjustment in our article.

More batteries...

1.5 Bn vehicles globally

8 kg Li/electric vehicle

= 12 M tonnes Li



Global reserves = 21 M tonnes Li

o^o develop new battery tech

The One Single Biggest Problem...

We can't afford this.

Some communities and countries more than others. Seek a just transition.

But we also can't afford not to do it - there's no choice left, because ...

Years of fossil fuel reserves left, 2020

Years of global coal, oil and natural gas left, reported as the reserves-to-product (R/P) ratio which measures the number of years of production left based on known reserves and present annual production levels. Note that these values can change with time based on the discovery of new reserves, and changes in annual production.



Data source: Energy Institute - Statistical Review of World Energy (2024)

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*this
is
you*