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A7 Introduction of Renewable Energy

PROJECT NUMBER : 2023-2-TR01-KA154-YOU-000168735







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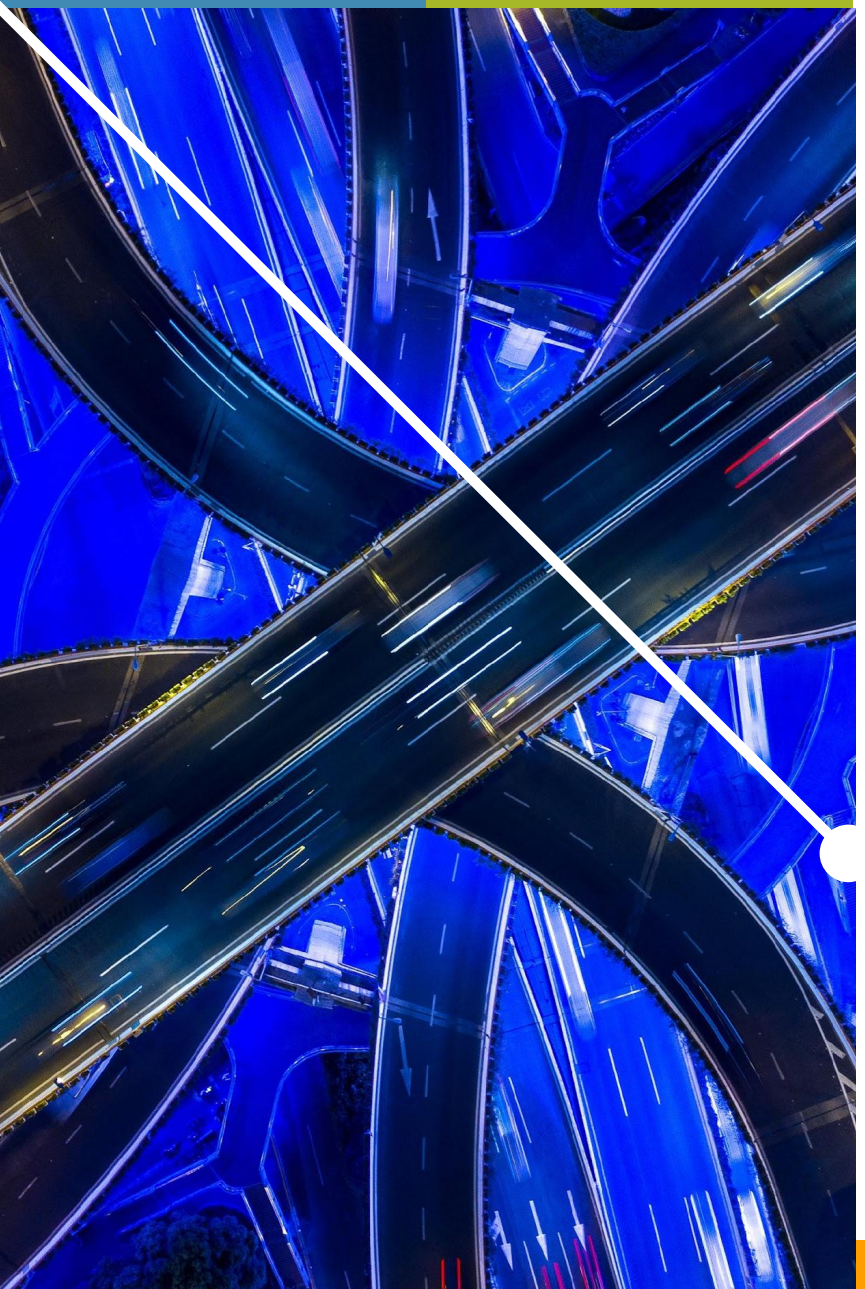
GREEN EUROPE

INTRODUCTION OF RENEWABLE ENERGY SOURCES

- PRESENTATION: A7
- PROJECT NUMBER : 2023-2-TR01-KA154-YOU-0001687335

TOPICS

1. Fossil fuels
2. Statistics on fossil fuels and other energy resources
3. Greenhouse gases
4. References



FOSSIL FUELS

WHAT ARE THE FOSSIL FUELS

Commonly used fossil fuel types are coal, oil and petroleum products and natural gas.

WHAT ARE THE FOSSIL FUELS

Fossil fuels orginate from the remains of prehistoric plants and animals that were buried under layers of rock for millions of years.

WHAT ARE THE FOSSIL FUELS

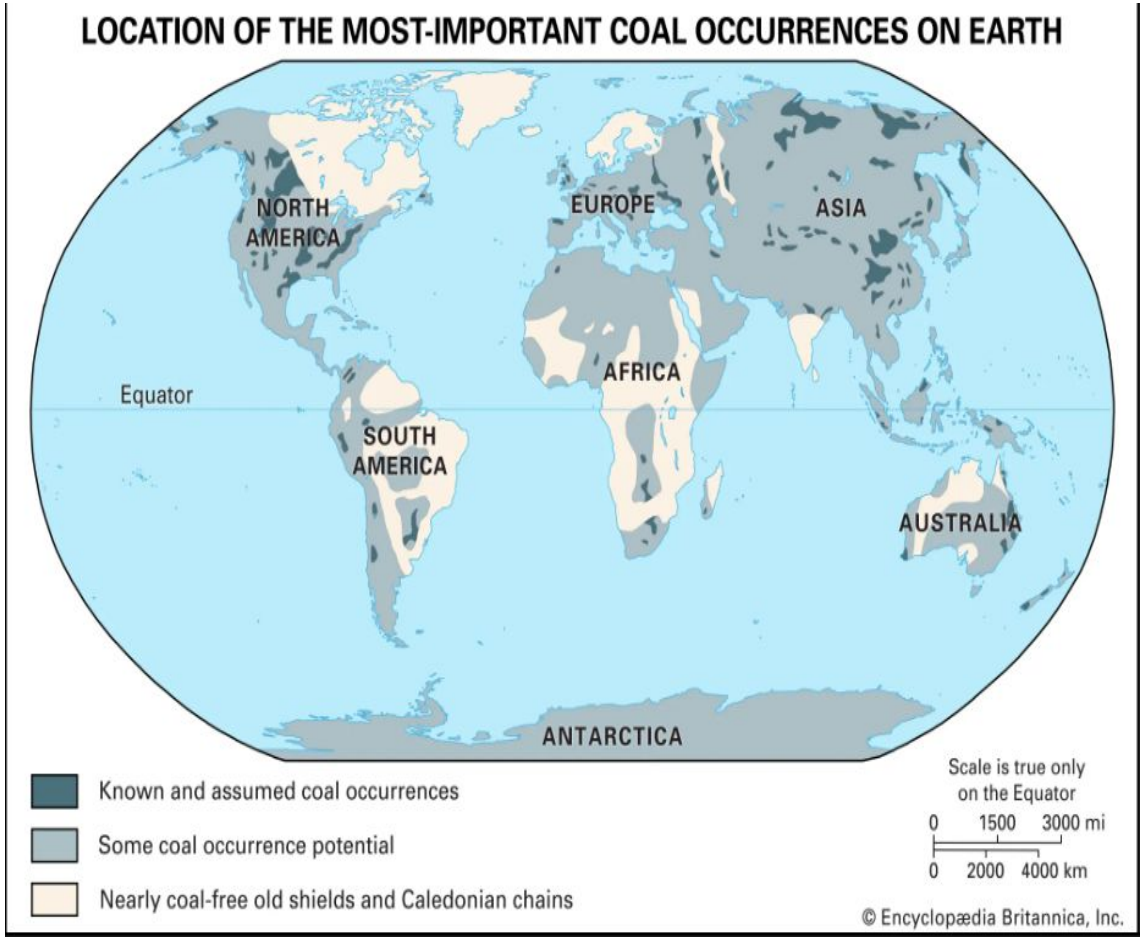
Due to different compositions of organic matter and different environmental factors like temperature, pressure and time different types of fossil fuels are formed.

WHAT ARE THE FOSSIL FUELS

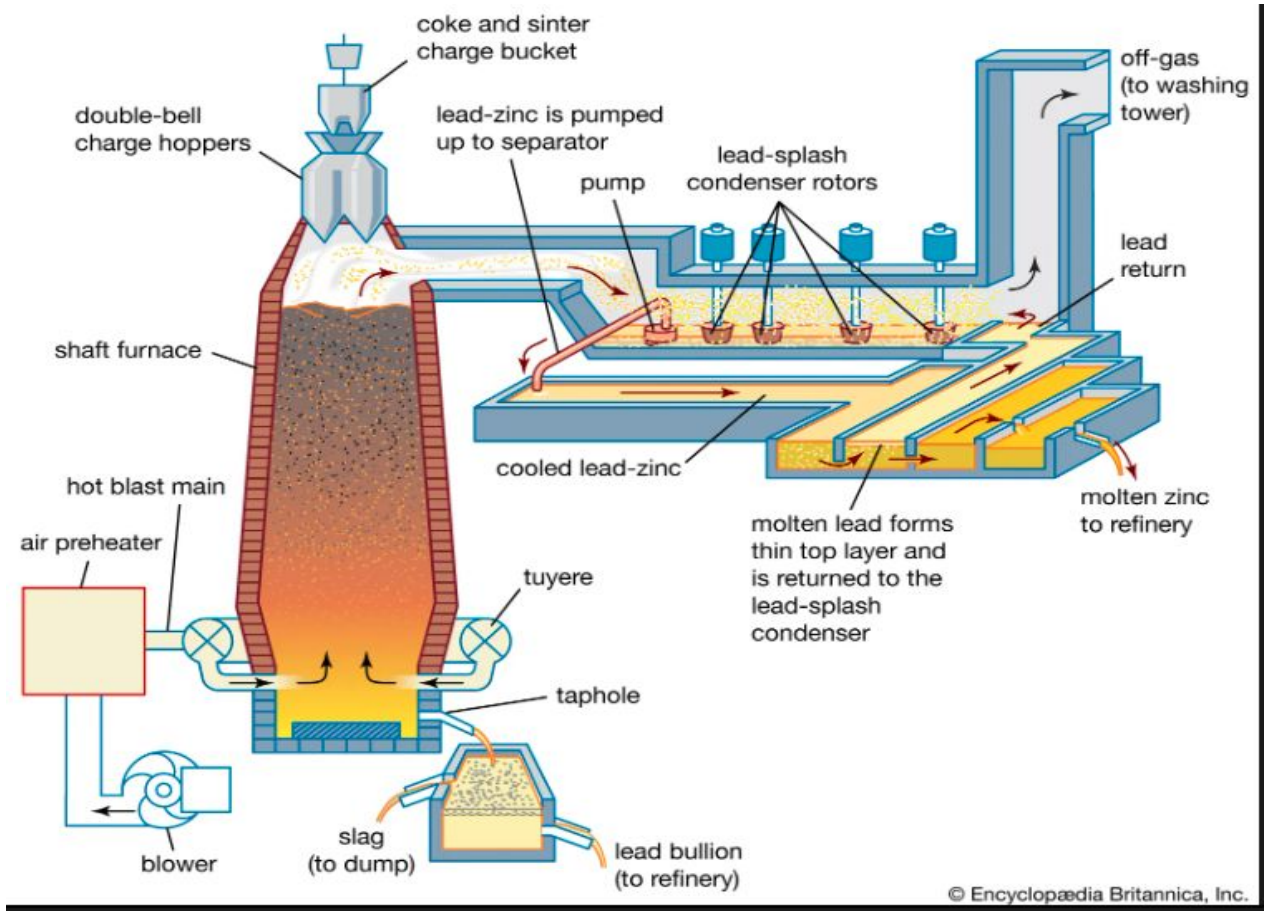
There are several major types of fossil fuels.

SOLID FOSSIL FUELS OR COAL



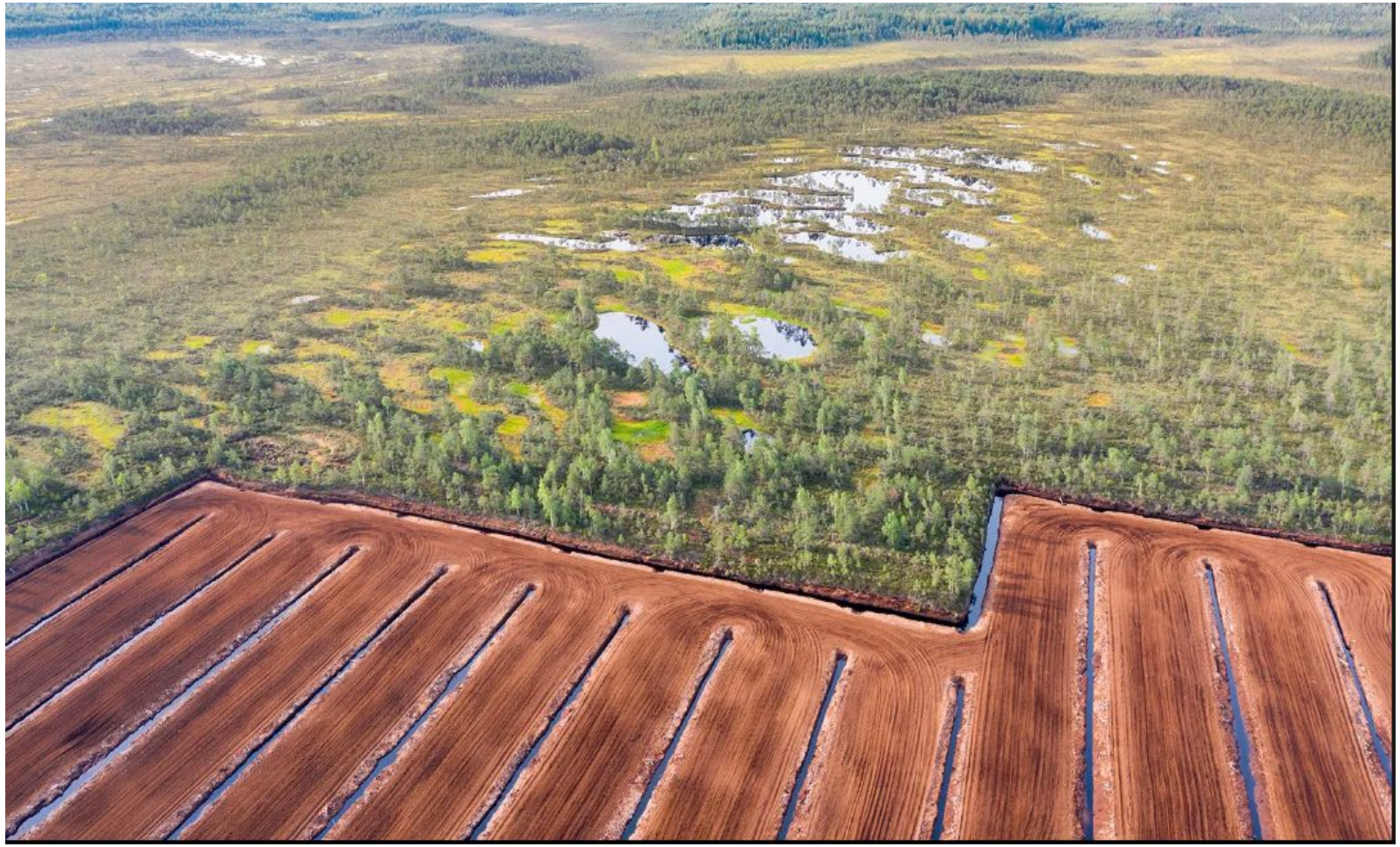


MANUFACTURED GASES





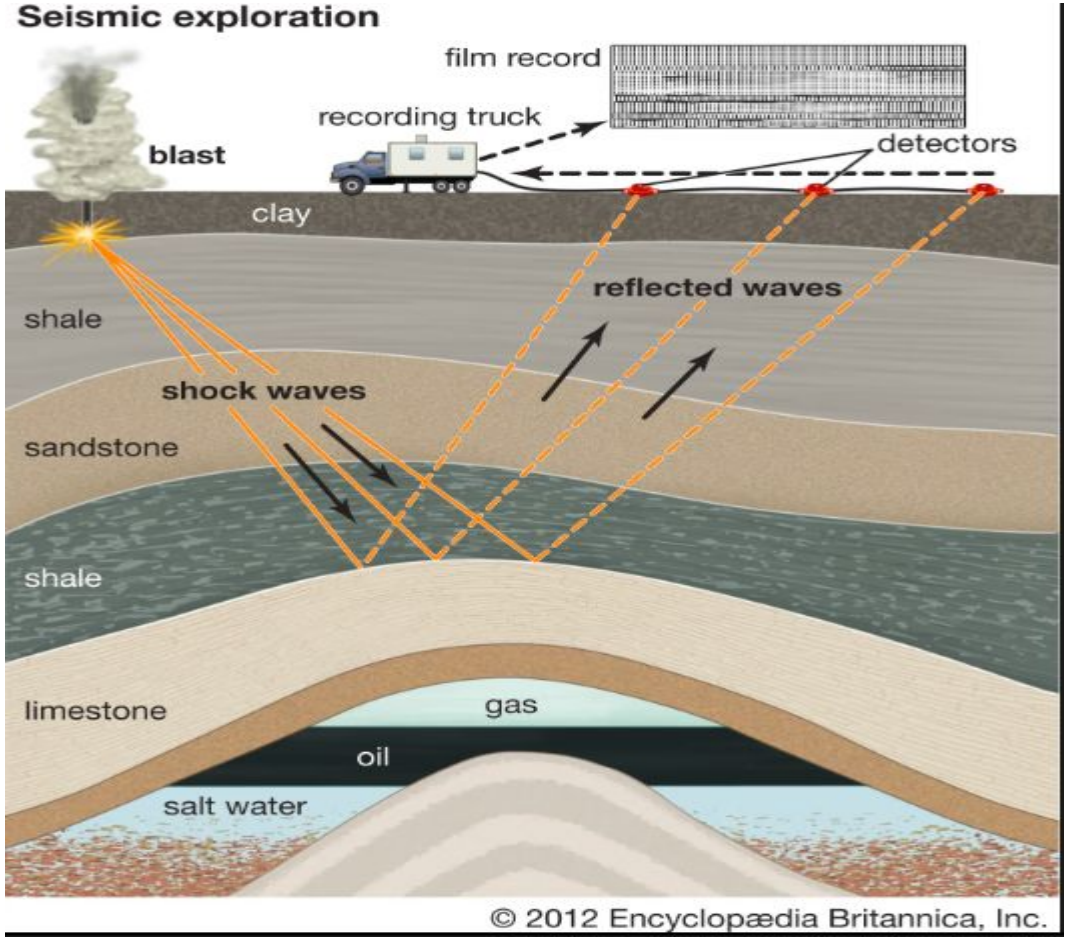
PEAT AND PEAT PRODUCTS



OIL SHALE AND OIL SANDS



OIL AND PETROLEUM PRODUCTS



NATURAL GAS



NON-RENEWABLE WASTE

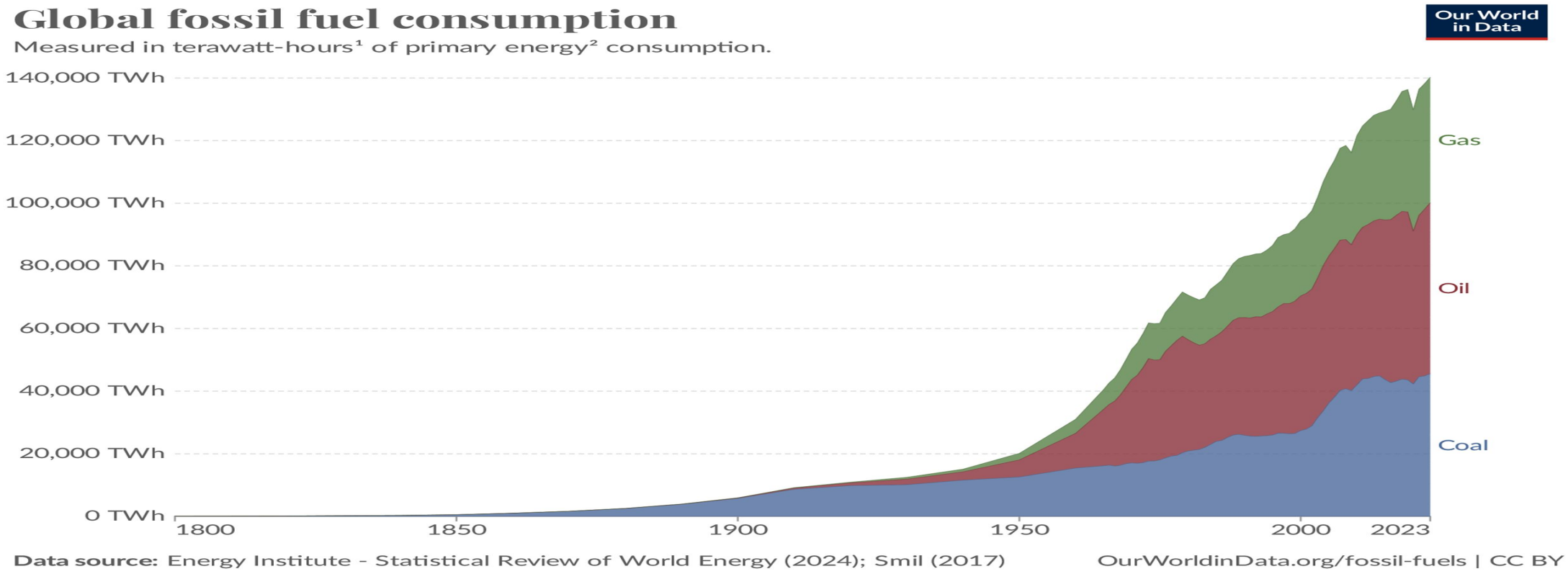




STATISTICS ON FOSSIL FUELS AND OTHER ENERGY SOURCES

Fossil fuels are the most widely used energy sources in the world

GLOBAL FOSSIL FUEL CONSUMPTION



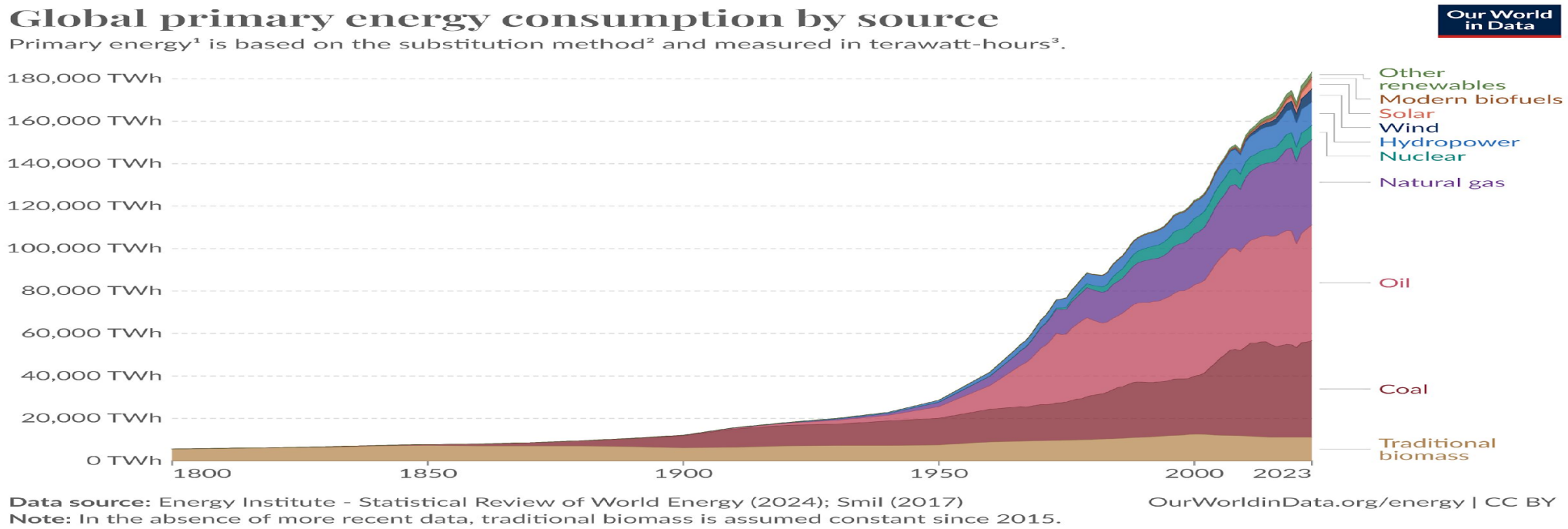
1. **Watt-hour**: A watt-hour is the energy delivered by one watt of power for one hour. Since one watt is equivalent to one joule per second, a watt-hour is equivalent to 3600 joules of energy. Metric prefixes are used for multiples of the unit, usually: - kilowatt-hours (kWh), or a thousand watt-hours. - Megawatt-hours (MWh), or a million watt-hours. - Gigawatt-hours (GWh), or a billion watt-hours. - Terawatt-hours (TWh), or a trillion watt-hours.

2. **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.

GLOBAL FOSSIL FUEL CONSUMPTION

According to data from 2023 global consumptions of coal produce 45,565 TWh (terawatt-hour), oil produce 54,546 TWh, natural gas 40,102 TWh and total global consumption of fossil fuels produce 140,231 TWh.

GLOBAL PRIMARY ENERGY CONSUMPTION BY SOURCE



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.

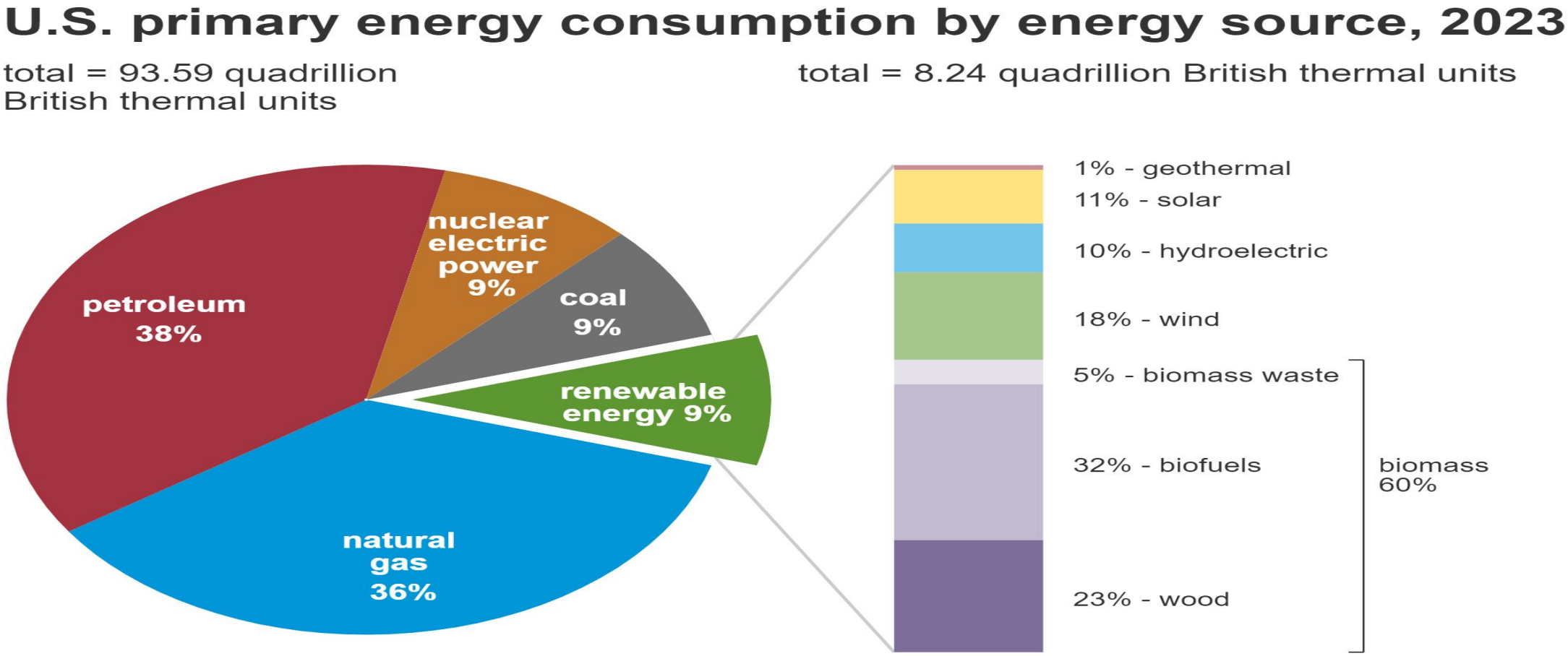
2. Substitution method: The 'substitution method' is used by researchers to correct primary energy consumption for efficiency losses experienced by fossil fuels. It tries to adjust non-fossil energy sources to the inputs that would be needed if it was generated from fossil fuels. It assumes that wind 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.

3. Watt-hour: A watt-hour is the energy delivered by one watt of power for one hour. Since one watt is equivalent to one joule per second, a watt-hour is equivalent to 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.

GLOBAL PRIMARY ENERGY CONSUMPTION BY SOURCE

According to data from 2023 global primary energy consumption is 183,230 TWh which 140,231 TWh of it produced by fossil fuels.

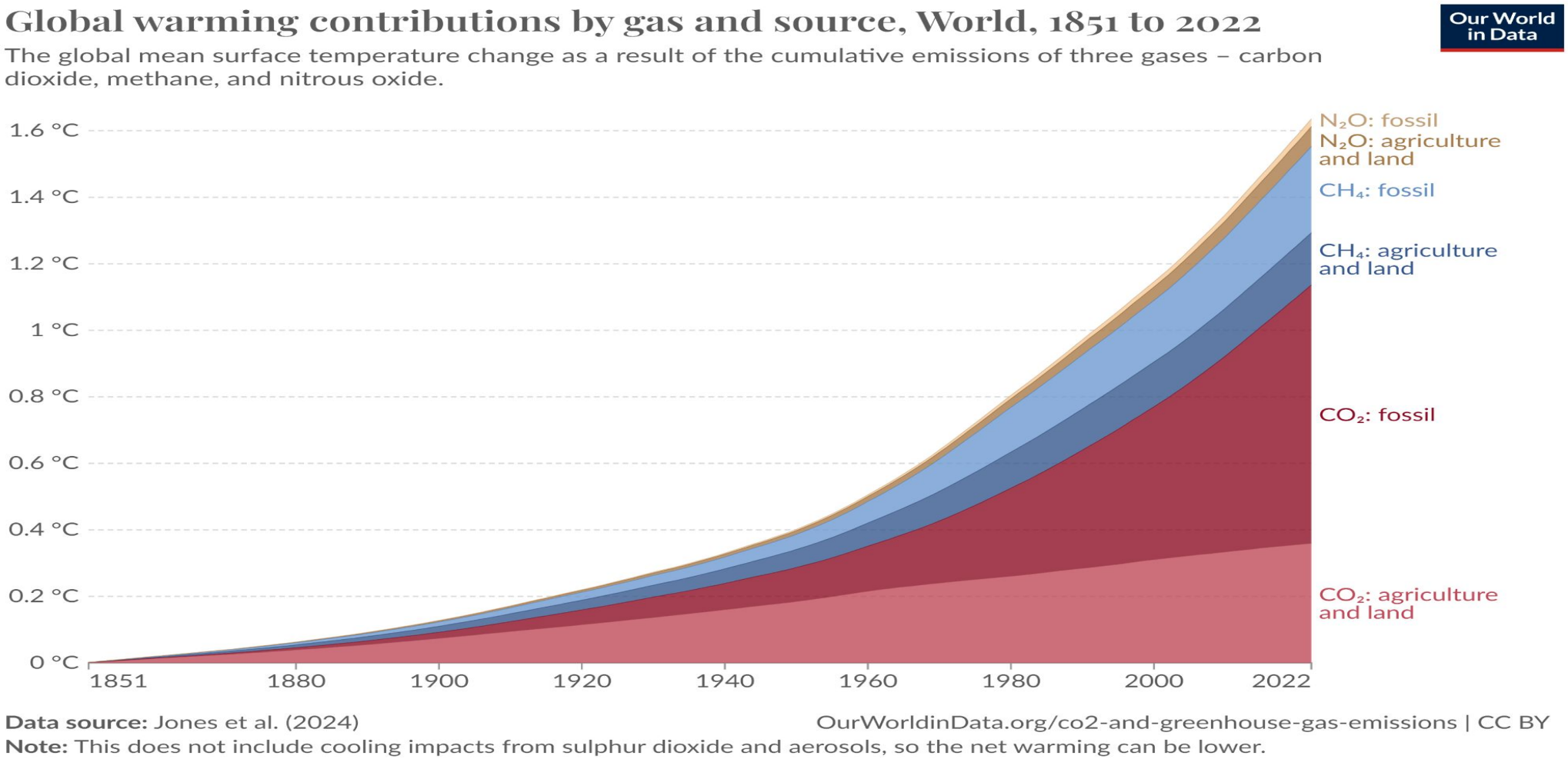
U.S. PRIMARY ENERGY CONSUMPTION BY ENERGY SOURCE, 2023



GREENHOUSE GASES

1. Greenhouse gases are substances that trap heat in Earth's atmosphere, leading to an increase in the planet's temperature.
2. While greenhouse gases are a natural part of earth's atmosphere human activity can increase their emission to harmful rate for environment.

GREENHOUSE GASES



GREENHOUSE GASES

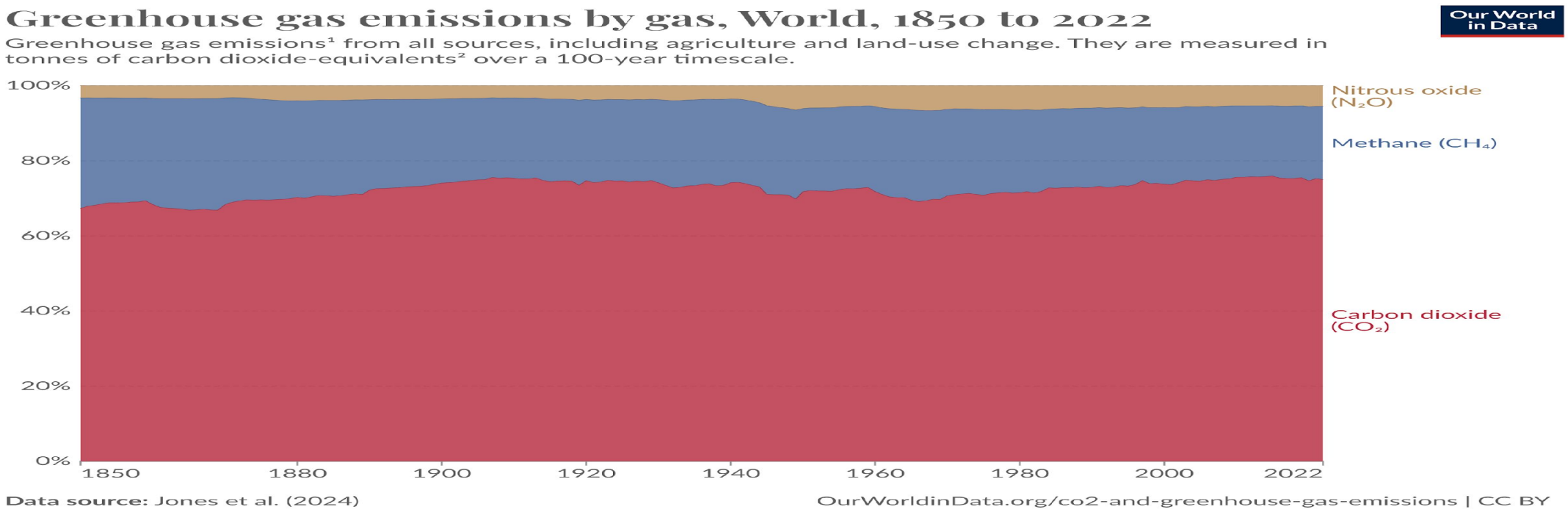
1. Fossil fuel consumption is leading source of human activity caused greenhouse gas emissions.
2. Fossil fuels account for over 75% of global greenhouse gas emissions and almost 90% of all carbon dioxide emissions.

GREENHOUSE GASES

There are several main greenhouse gases:

- Carbon dioxide (CO_2)
- Methane (NH_3)
- Fluorinated gases

GREENHOUSE GAS EMISSIONS BY GAS, WORLD, 1850 TO 2022



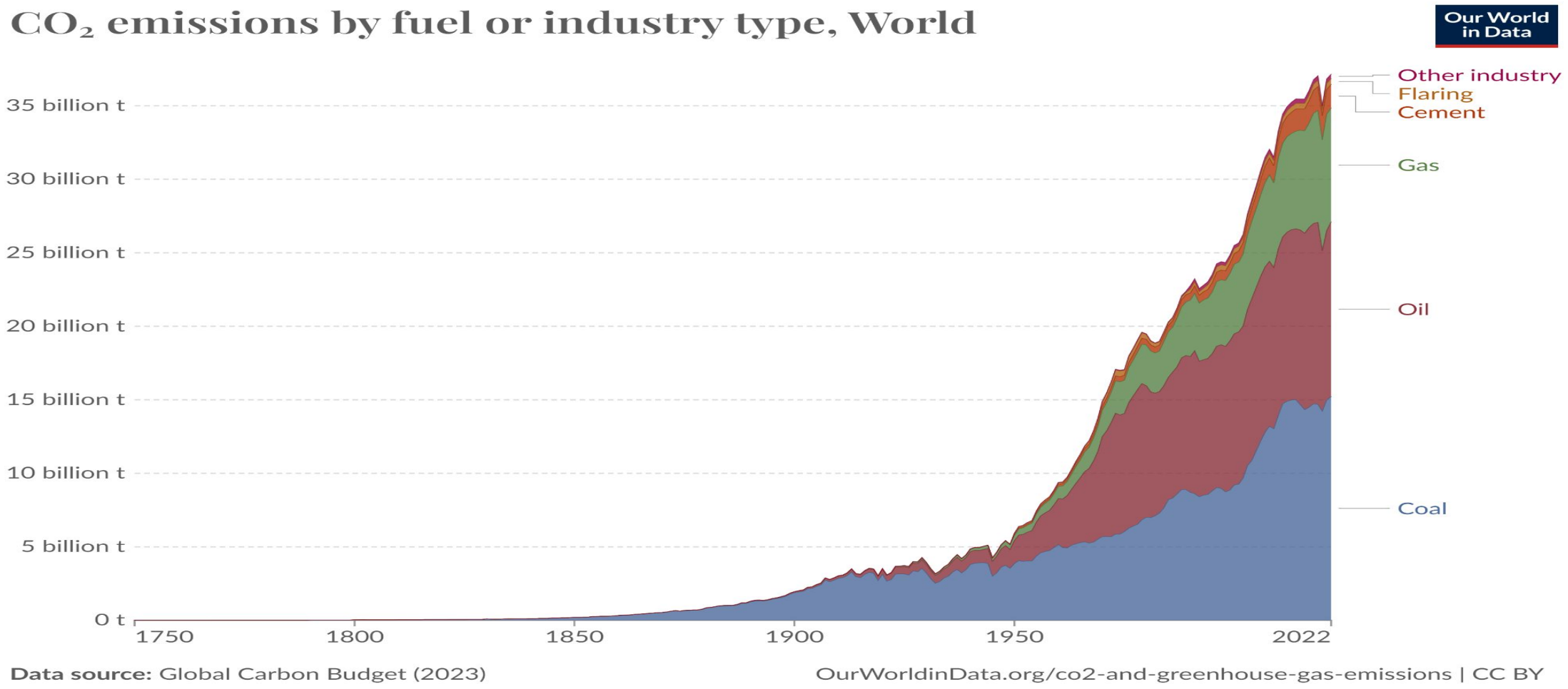
1. Greenhouse gas emissions: A greenhouse gas (GHG) is a gas that causes the atmosphere to warm by absorbing and emitting radiant energy. Greenhouse gases absorb radiation that is radiated by Earth, preventing this heat from escaping to space. Carbon dioxide (CO_2) is the most well-known greenhouse gas, but there are others including methane, nitrous oxide, and in fact, water vapor. Human-made emissions of greenhouse gases from fossil fuels, industry, and agriculture are the leading cause of global climate change. Greenhouse gas emissions measure the total amount of all greenhouse gases that are emitted. These are often quantified in carbon dioxide equivalents (CO_2eq) which take account of the amount of warming that each molecule of different gases creates.

2. Carbon dioxide equivalents (CO_2eq): Carbon dioxide is the most important greenhouse gas, but not the only one. To capture all greenhouse gas emissions, researchers express them in "carbon dioxide equivalents" (CO_2eq). This takes all greenhouse gases into account, not just CO_2. To express all greenhouse gases in carbon dioxide equivalents (CO_2eq), each one is weighted by its global warming potential (GWP) value. GWP measures the amount of warming a gas creates compared to CO_2. CO_2 is given a GWP value of one. If a gas had a GWP of 10 then one kilogram of that gas would generate ten times the warming effect as one kilogram of CO_2. Carbon dioxide equivalents are calculated for each gas by multiplying the mass of emissions of a specific greenhouse gas by its GWP factor. This warming can be stated over different timescales. To calculate CO_2eq over 100 years, we'd multiply each gas by its GWP over a 100-year timescale (GWP100). Total greenhouse gas emissions – measured in CO_2eq – are then calculated by summing each gas' CO_2eq value.

GREENHOUSE GAS EMISSIONS BY GAS, WORLD, 1850 TO 2022

According to data from 2022 most common type of greenhouse gas is carbon dioxide second most common type is methane and third is nitrous oxide.

CO_2 EMISSIONS BY FUEL OR INDUSTRY



CO_2 EMISSIONS BY FUEL OR INDUSTRY

According to data from 2022 coal is the fossil fuel which is leading source of the CO_2 emissions.



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THANK YOU FOR LISTENING

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