

Energy Data for Dummies

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January 2024

Energy Data for Dummies

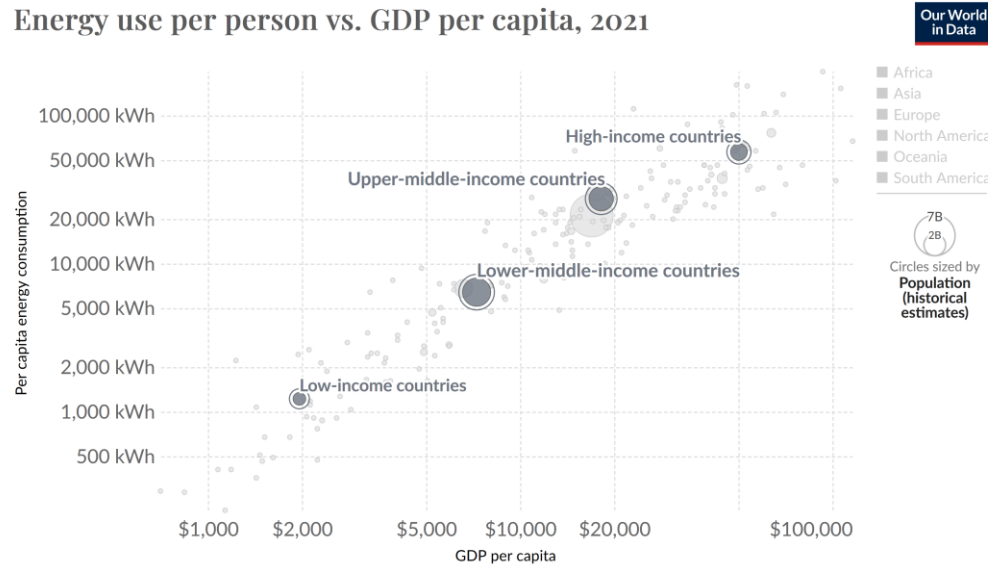
Independent
Commentator on
Climate and
Energy



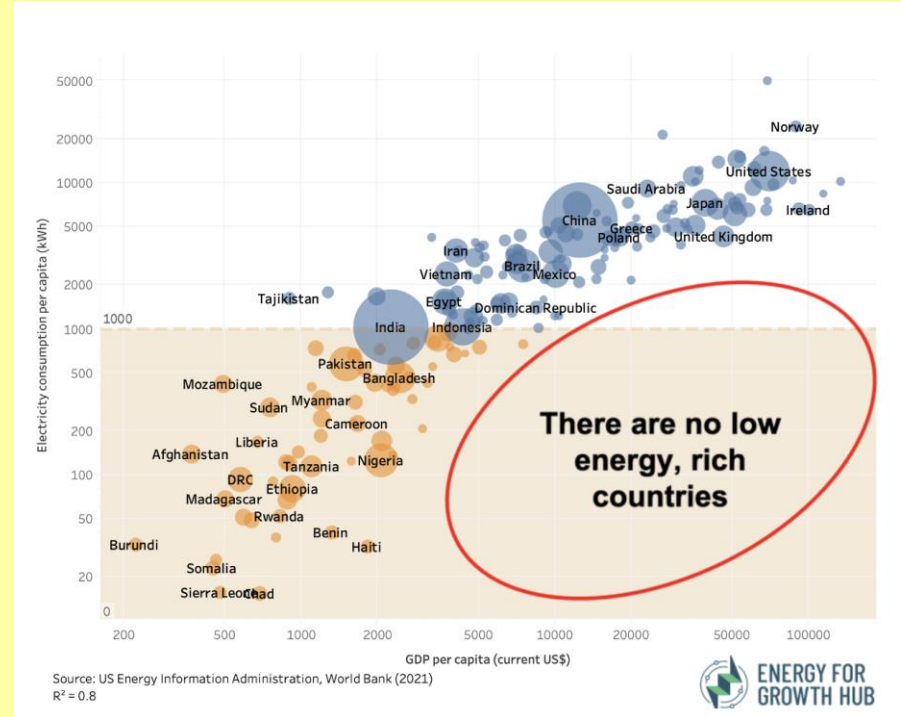
<https://youtu.be/sYOm0ZEmJ8o>

Energy and Prosperity

Energy use per person vs. GDP per capita, 2021

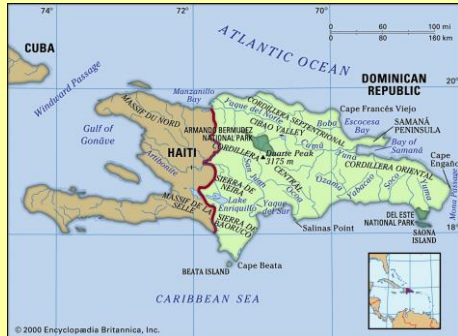


Data source: U.S. Energy Information Administration (EIA); Energy Institute Statistical Review of World Energy (2023); Data compiled from multiple sources by World Bank
 Note: Energy refers to primary energy – the energy input before the transformation to forms of energy for end-use (such as electricity or petrol for transport).
OurWorldInData.org/energy | CC BY



Source: US Energy Information Administration, World Bank (2021)
 $R^2 = 0.8$

Energy and Prosperity (2)



Thermodynamics



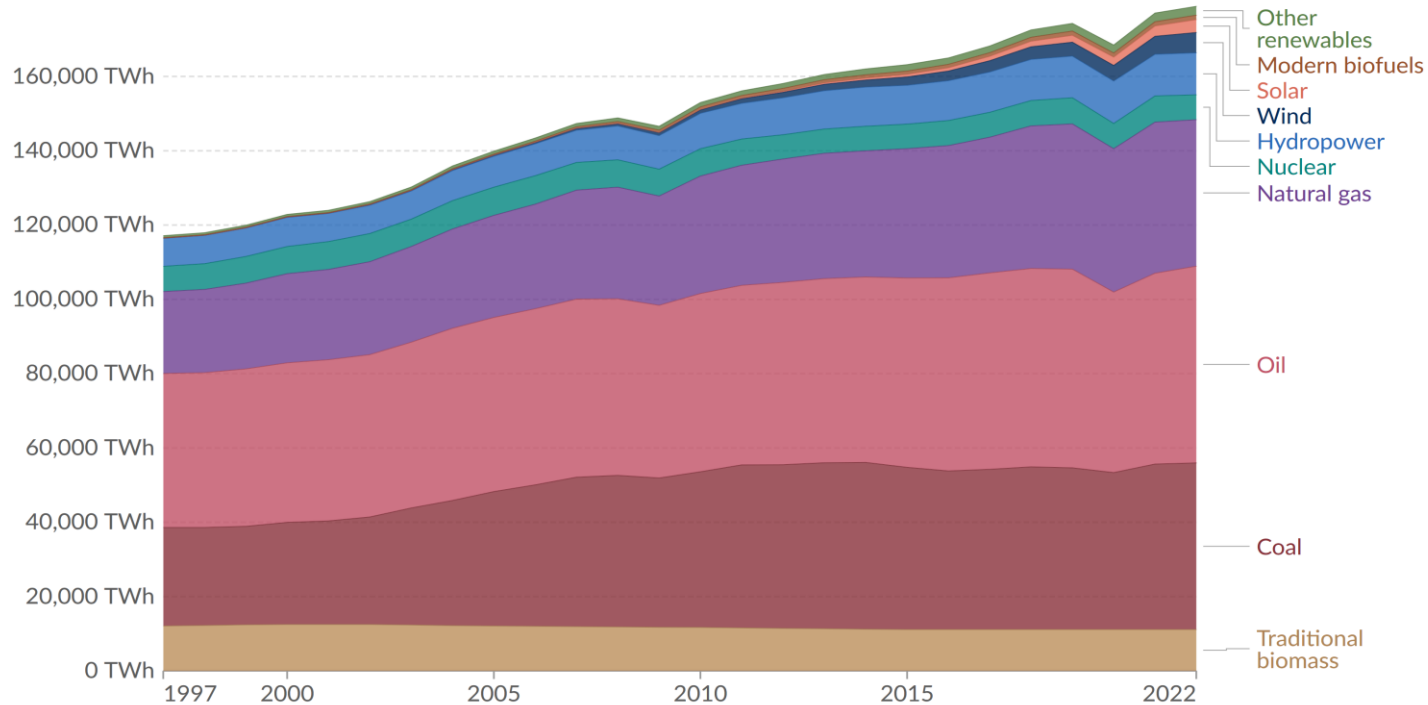
*'There is no such thing
as a Free Lunch'*

Where Does Our Energy Come From?

Global primary energy consumption by source

Primary energy is based on the substitution method and measured in terawatt-hours.

Our World
in Data

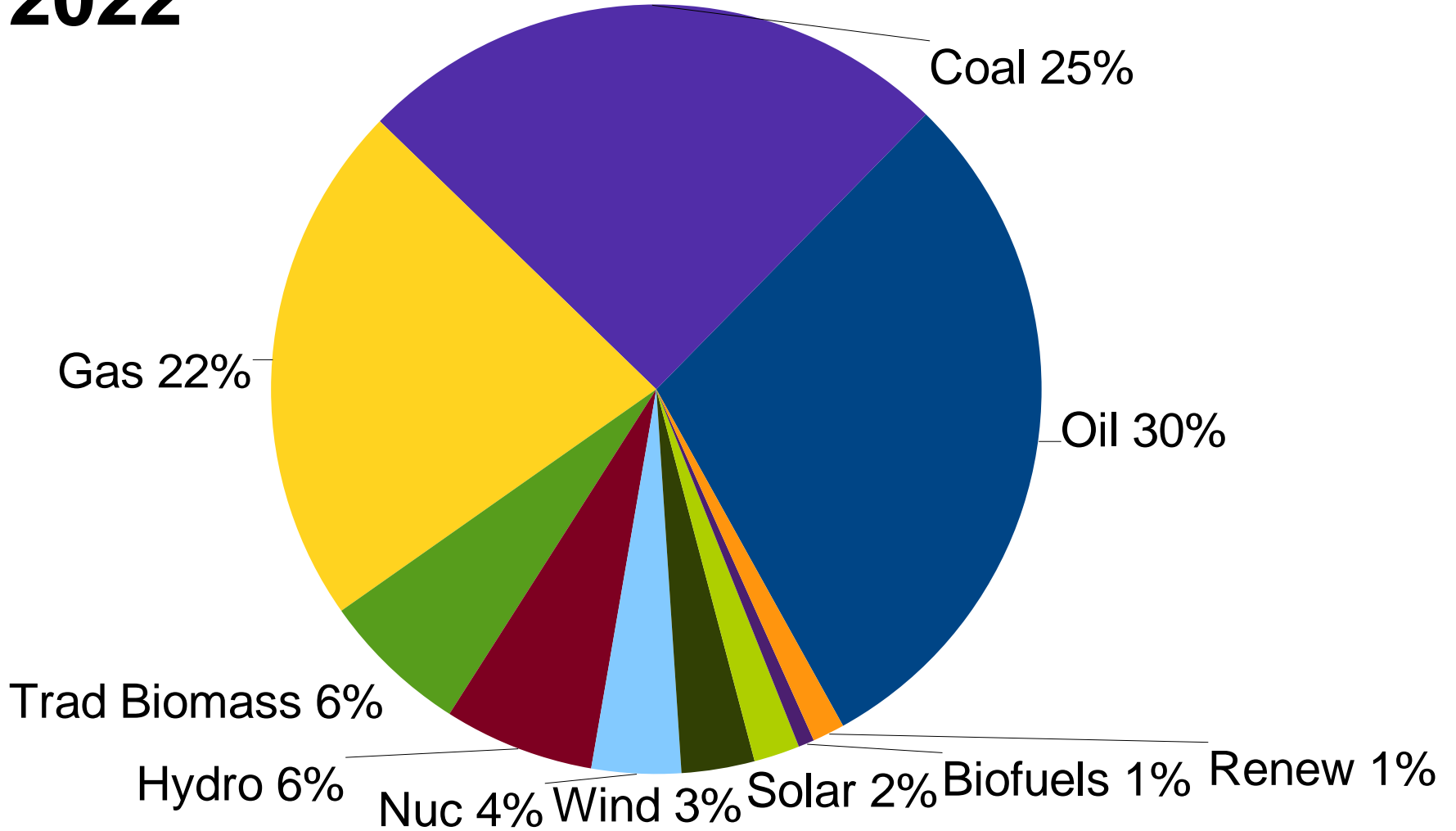


Data source: Energy Institute - Statistical Review of World Energy (2023); Smil (2017)

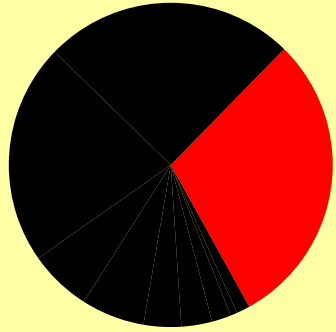
Note: In the absence of more recent data, traditional biomass is assumed constant since 2015.

OurWorldInData.org/energy | [CC BY](https://creativecommons.org/licenses/by/4.0/)

2022



Oil

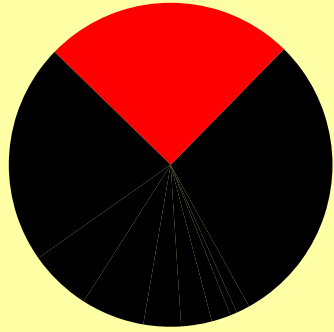


~50 years remaining

Versatile, storable,
controllable, reliable



Coal



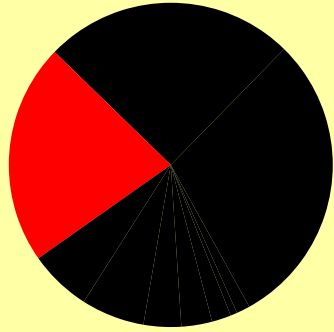
~400 years remaining

Storable, controllable,
reliable

40% of electricity



Gas



~50 years remaining

Storable controllable

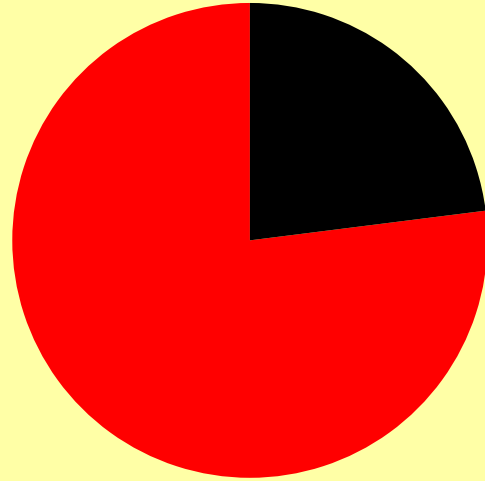
reliable



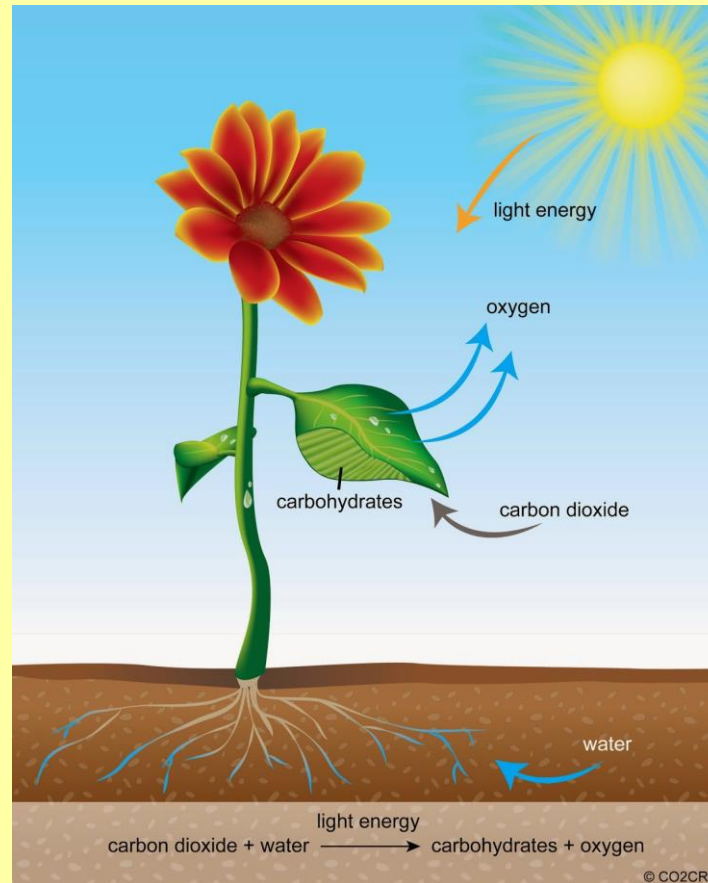
Fracking



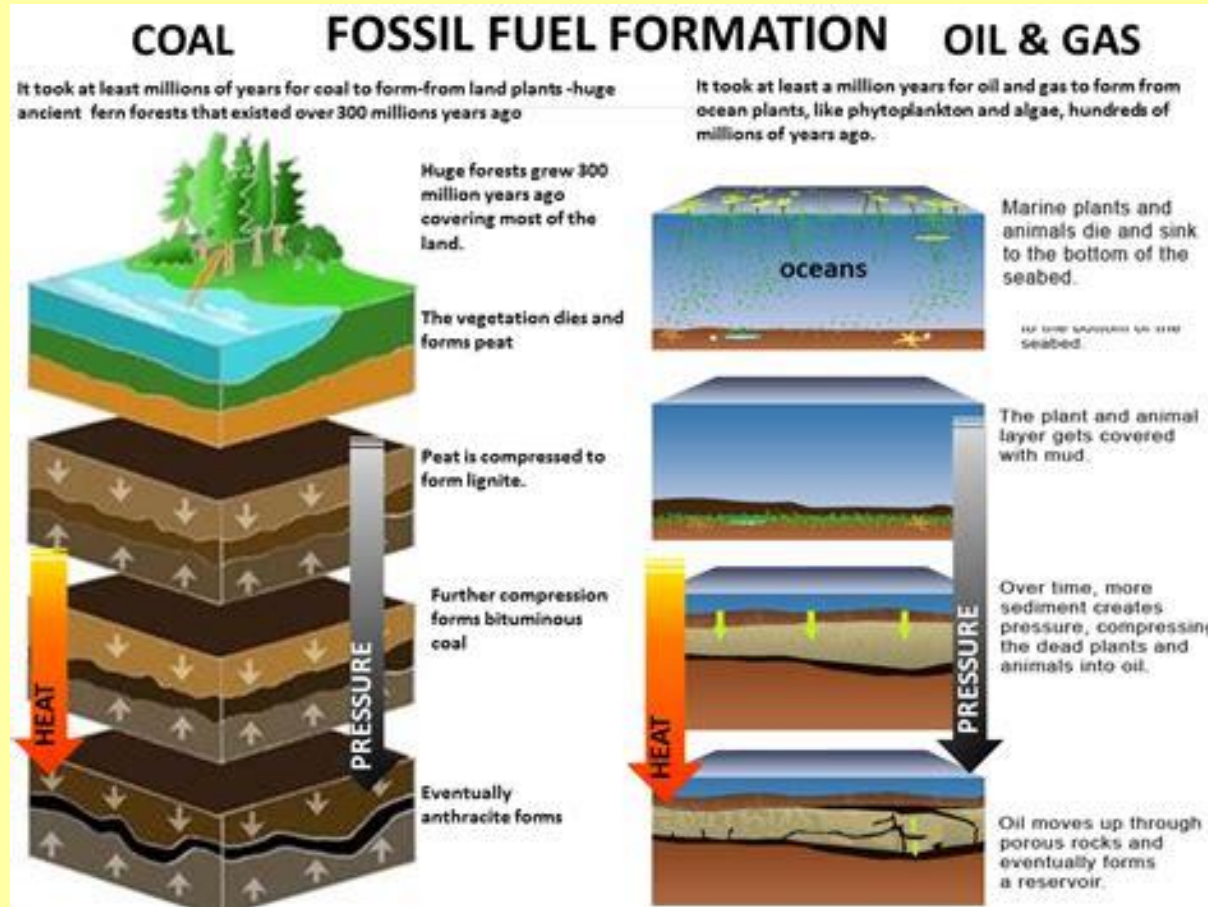
Fossil Fuels Today – 77%



Photosynthesis



Making Fossil Fuels



Burning Fossil Fuels

Combustion Reaction



Hydrocarbon

+



Oxygen



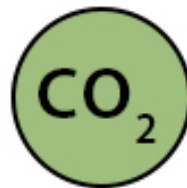
Heat and
light

+



Water

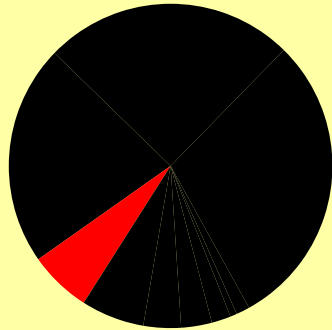
+



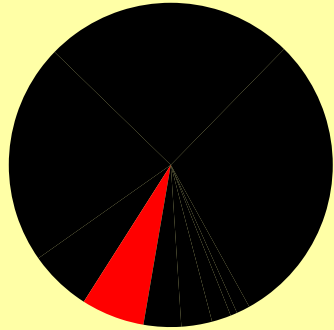
Carbon
dioxide



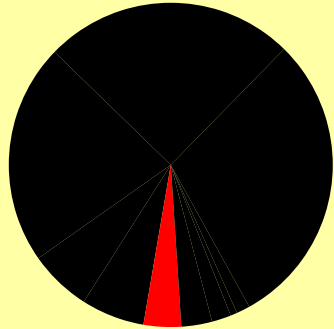
Biomass



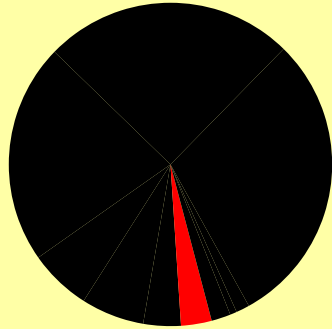
Hydro




Nuclear



Wind



GENERAL HIGHER EDUCATION SYSTEM FOR ENVIRONMENTALIST ENERGY STUDIES



$1 \times 0 \text{ M/s} = 0 \text{ W}$



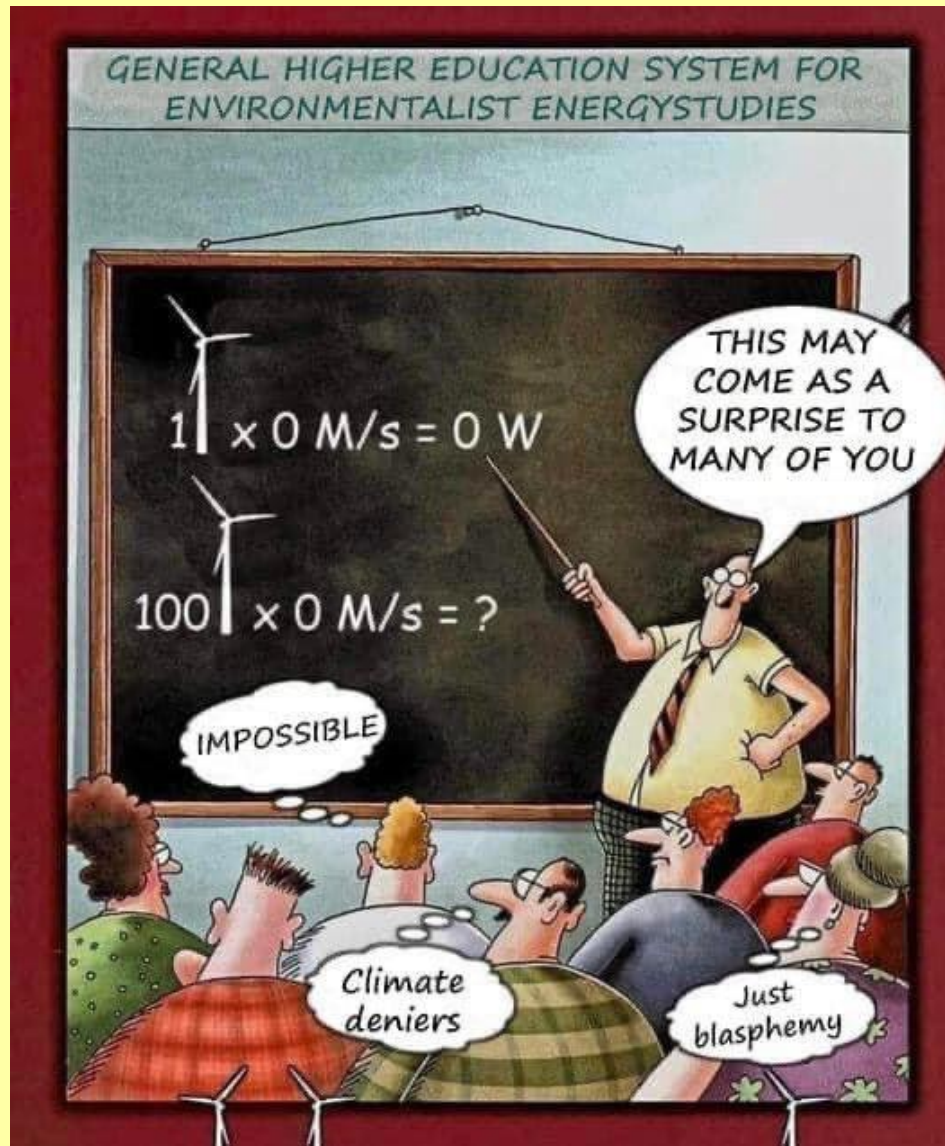
$100 \times 0 \text{ M/s} = ?$

THIS MAY COME AS A SURPRISE TO MANY OF YOU

IMPOSSIBLE

Climate deniers

Just blasphemy



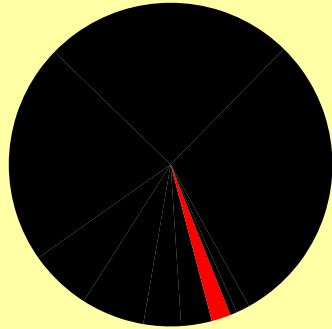
Energy Storage

Hope and Hype

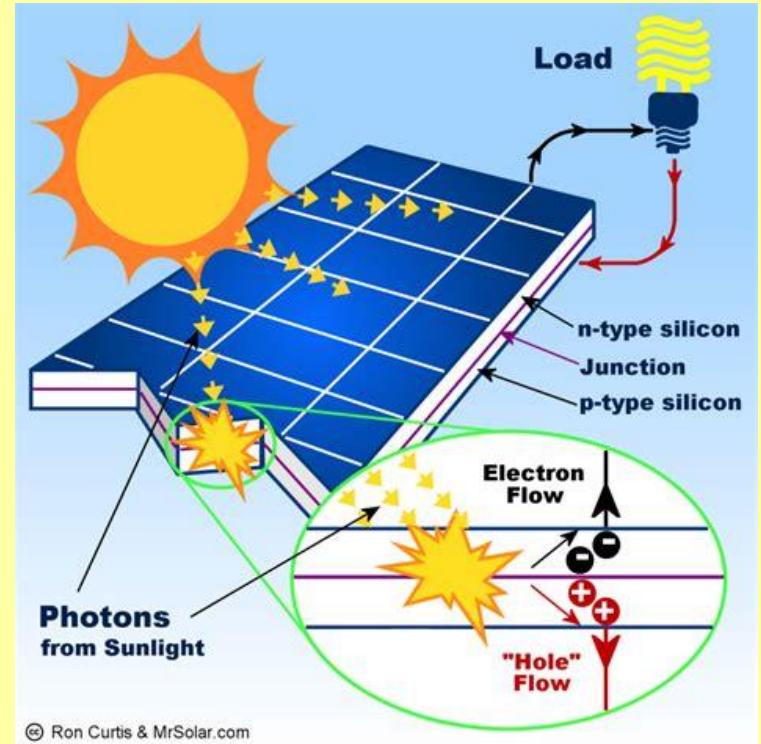
==> But no delivery



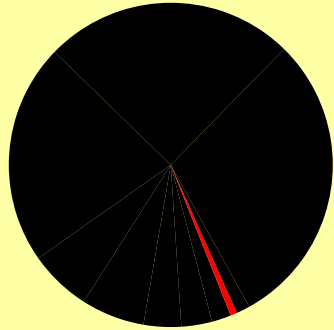
Solar



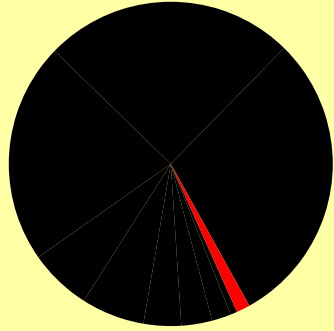
Excellent at midday in
the summer



Biofuels

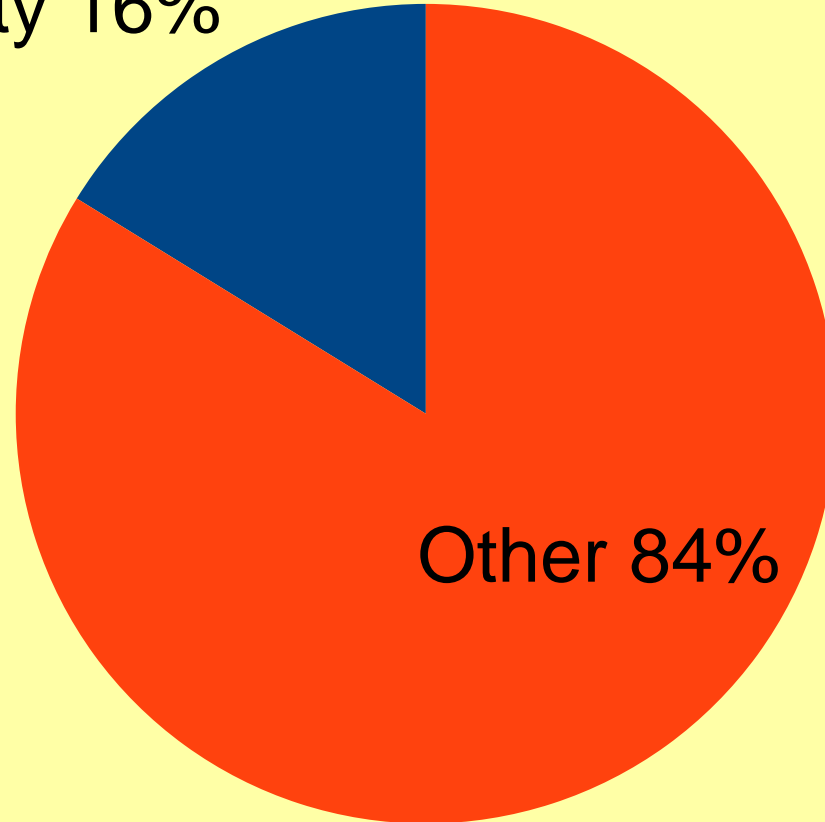


Other Renewables



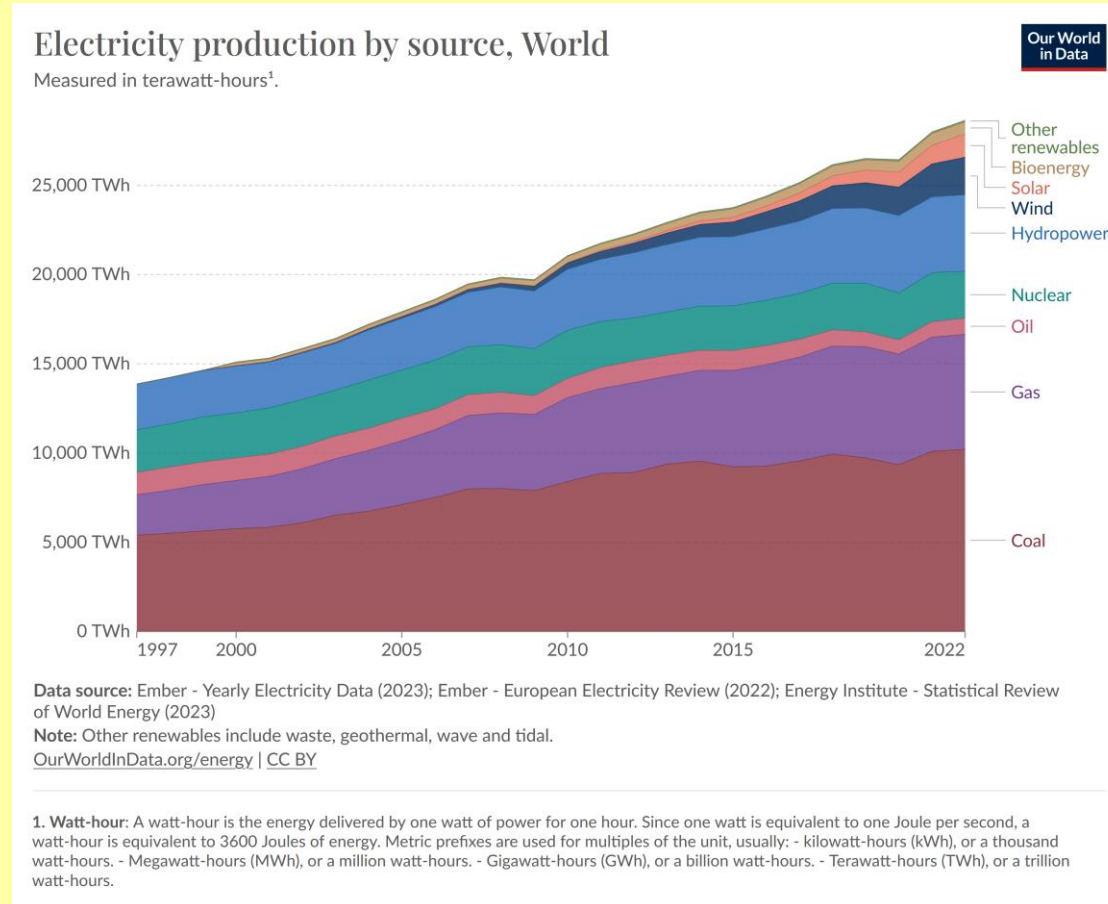
Energy and Electricity Worldwide

Electricity 16%



Other 84%

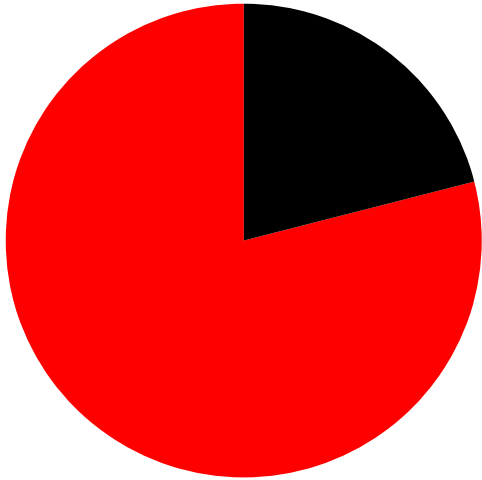
Renewables Revolution?



Conclusion 1 : Fossil Fuels Still Rule OK!

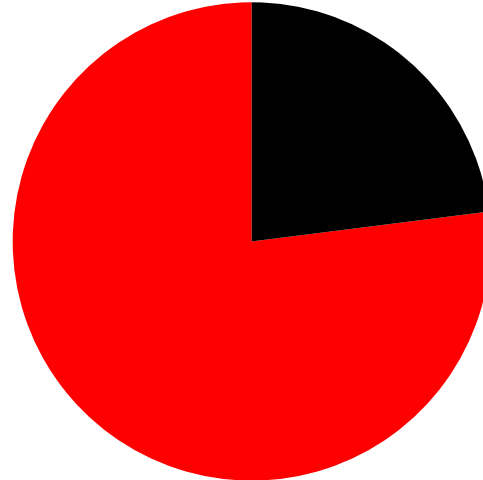
Fossil Fuels

2012

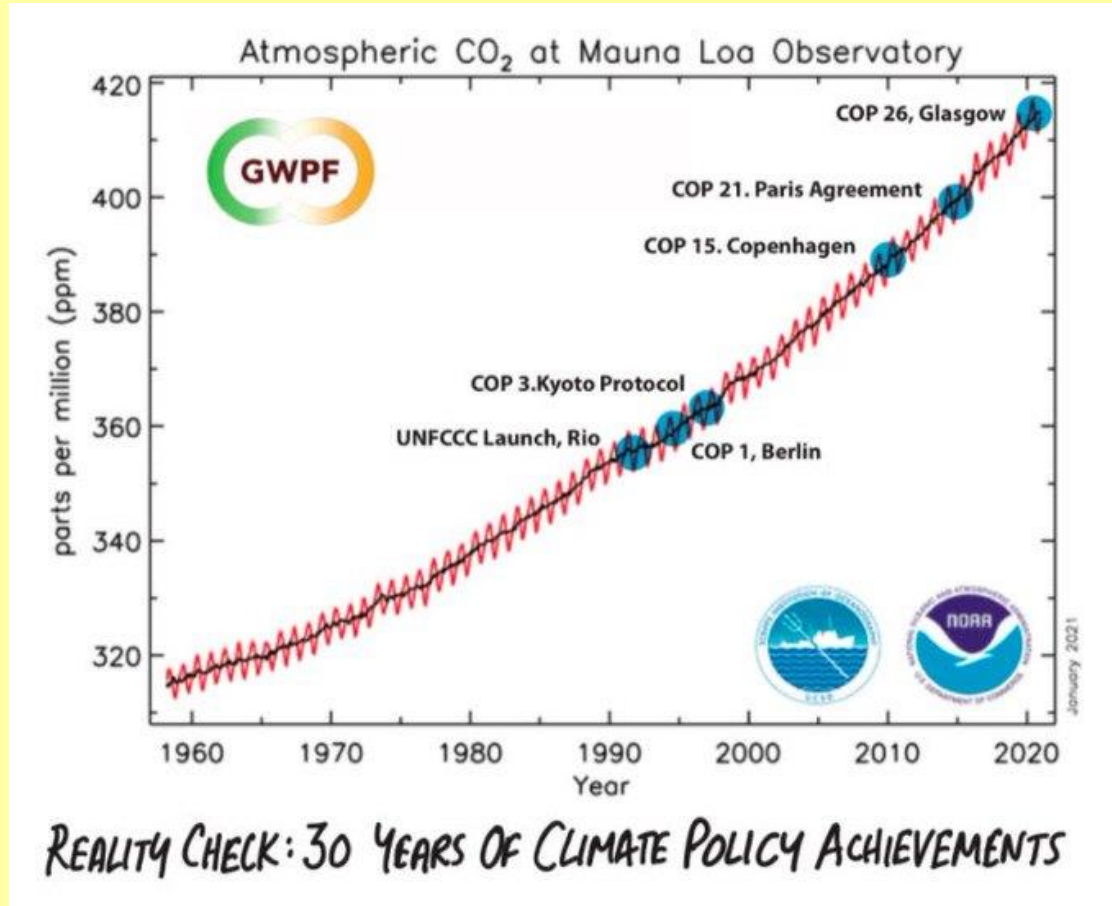


Fossil Fuels

2022



Conclusion 2: Net Zero is a Flop



Conclusion 3:

==> Spend money on adapting to climate change, not fighting it

Summary

Don't believe the hype – believe the data

There is no such thing as a free lunch!