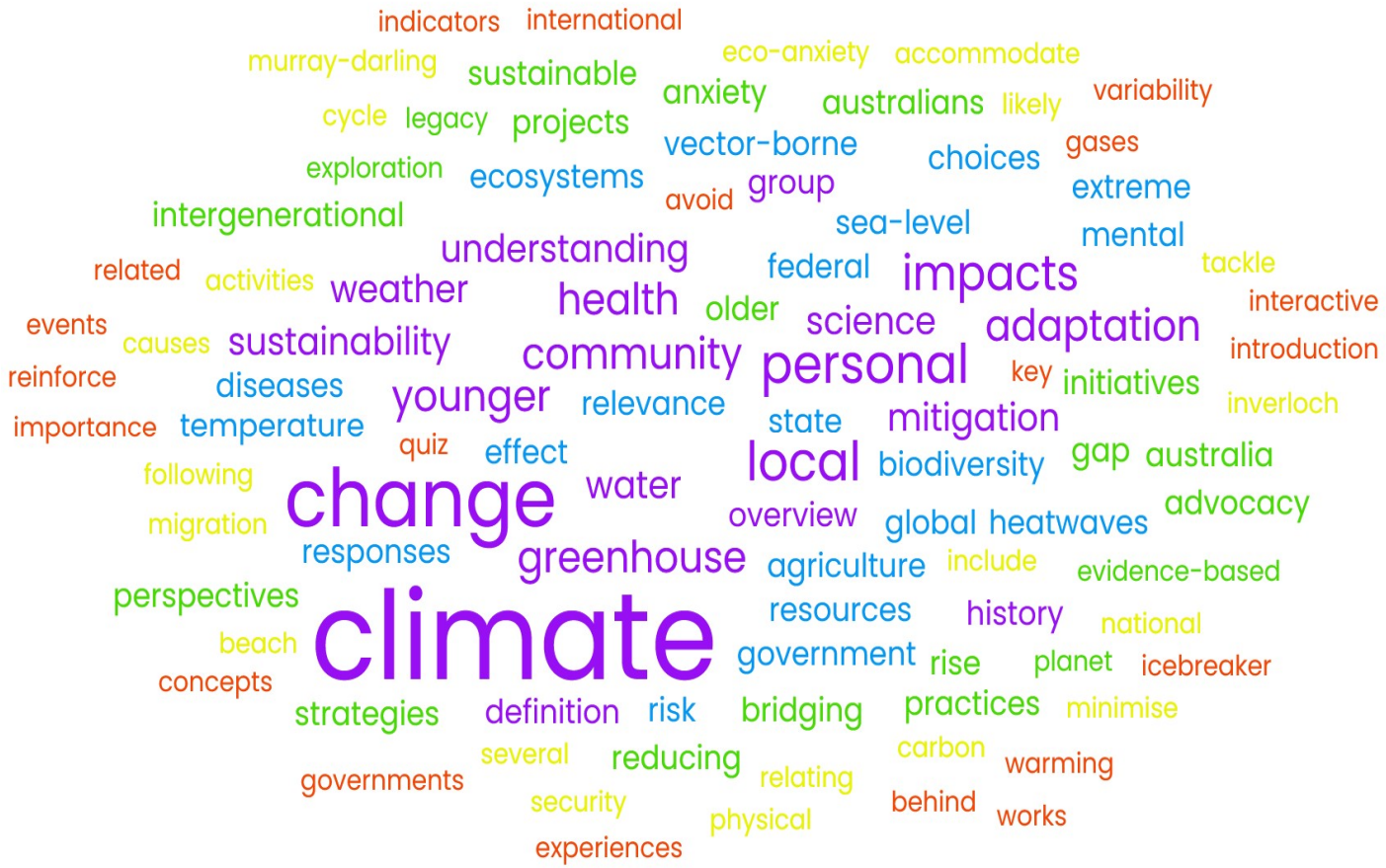
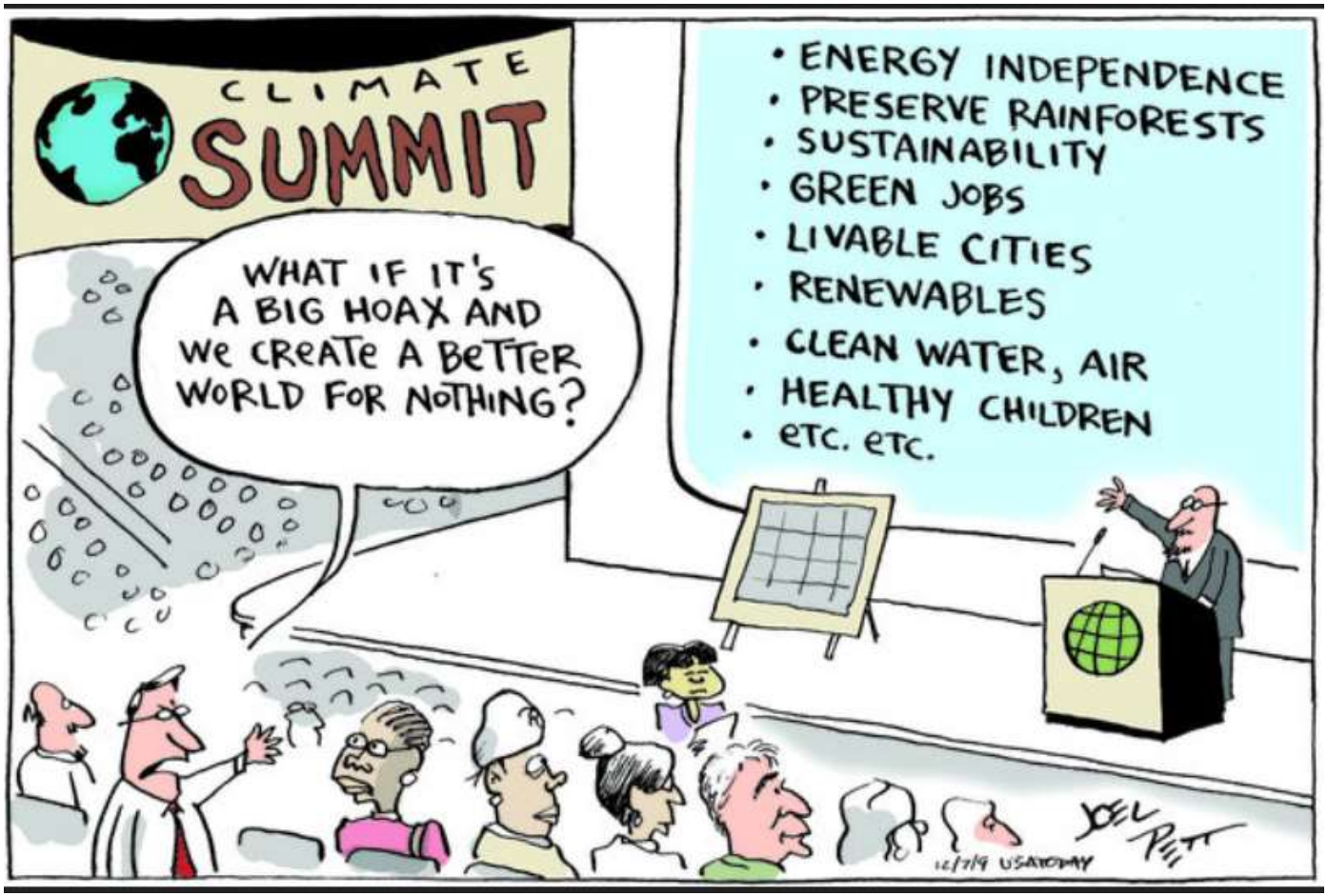
Our Planet, Our Legacy: Understanding Climate Change

U3A Wonthaggi

Session 2
29/4/2025



Before we start …



… sadly, it's not a "big hoax" …

IPCC 2023 Summary for Policymakers:

"A1. Human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850-1900 in 2011-2020." (emphasis added)

[*MNN:* 2024: 1.55 °C ± 0.13 °C]

https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf and *https://wmo.int/media/news/wmo-report-documents-spiralling-weather-and-climate-impacts*

… still, I'm not sure we are creating a better world, yet.

Nonetheless:

Today

- Reflections on last week
  - Volunteer for next week's reflections?
- The heating of the atmosphere – John
- Water, carbon and methane cycles
  - Stocks and flows
- CO_2e – adding apples with oranges
- Some mitigation options

Reflection on last week

- Different backgrounds; different levels and types of knowledge
- We all agree that climate change is happening, now
- It's dangerous, scary, existential … not enough is being done
- We all want action on climate
- Not an action group
- Many, many others groups are:
  - Bass Coast Climate Action Network (Bass Coast CAN)*
  - ACF, Environment Victoria, Rising Tide, XR, Market Forces, Australasian Centre for Corporate Responsibility, Vote Climate, Get Up!, Climate for Change, Climate Reality Project, Greenpeace, Wilderness Society, BZE, VCAN, CANA, Climate Council, 350.org, etc, etc.**
  - Specialist groups for: women, religious, youth/students, artists, farmers, vegetarians/vegans (Less Meat Less Heat), doctors, other health workers, teachers, psychologists, investors, public transport users, policy wonks, etc, etc.**

* www.facebook.com/BassCoastCAN; to join the e-mail list (usually just one e-mail per moth) contact basscoastcan@gmail.com

** Websites for most of these groups are at https://vcan.net.au/find-a-group/

If not about action why are we here?

- A learning group:
  - share information*
  - think about topics from different perspectives
  - learn from each other
  - expand our own knowledge base
- Explore a range of topics
  - Some might: reinforce; challenge us to think differently; be new
  - Hopefully, all add value to you and/or you add value for others
  - Occasional "solutions" or directions of travel
- Consider does it (should it) fit with our personal frameworks?
  - E.g., more persuasive, better listener, new direction …
- Help us each decide/clarify what actions we want to:
  - see/encourage/demand from others – individually and collectively
  - take ourselves: *be the change*, activist, better citizen, blogger …
- Help make those actions more effective
- Solidarity

* (a) http://u3aclimate2025.fastmail.fm – no username; password = Wonthaggi (not a secure site). (b) Mik Aidt: https://climatesafety.info/

Revised topics

3) Stationary energy – the biggest source (Werner?):
   - Coal, oil and gas: the main drivers
   - A gas lead recovery v's electrification ; renewables v's nuclear
4) Equity:
   - winners and losers – people, global and local
   - humans v other species – biodiversity loss
   - legal attempts to bridge the gap
5) Bass Coast and Tipping points:
   - mid-term review of the 2020-30 Carbon Action Plan
   - BCSC emergency planning
   - have we reached tipping points, if so what now, e.g., the importance of adaptation
6) Health and Economics
   - physical and mental health (Michelle)
   - economic impacts of the climate crisis
   - different models:: Keynesian, neoliberalism, donut economics and degrowth
7) Regaining the momentum
   - the inability/unwillingness of politicians and businesses to act quickly
   - mis/disinformation and other strategies to keep the status quo (Big Coal, Atlas Group, etc)
   - getting "cut through" for the true climate message
8) Physical geography and local case study – Inverloch (Aileen)
9) Intergenerational dialogue
10) The last word, summary, wrap-up, what do we do now …

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John Di Stefano

The Heating of the Atmosphere

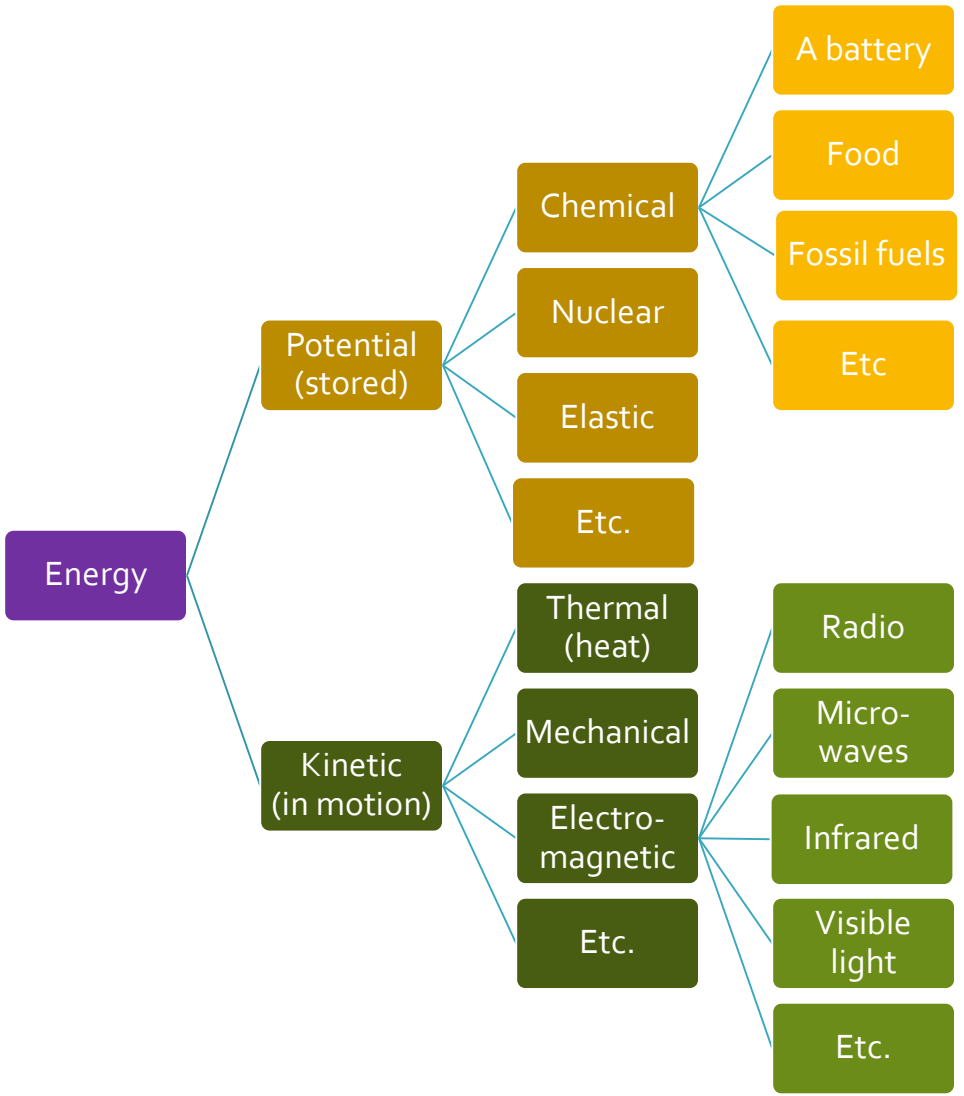
The purpose of this story is to give you an understanding of the reason why the Earth has been heating over the last two hundred years and why it will continue to heat.

This is the story of the simple molecules that constitute the Earth's atmosphere – the air we breathe!

The impact of this heating of the atmosphere on Earth's climate I will leave to others. PDF file

1. What is energy?
A. The ability to do work (any physical activity)

2. Energy can be converted from one form to another. What are these forms?



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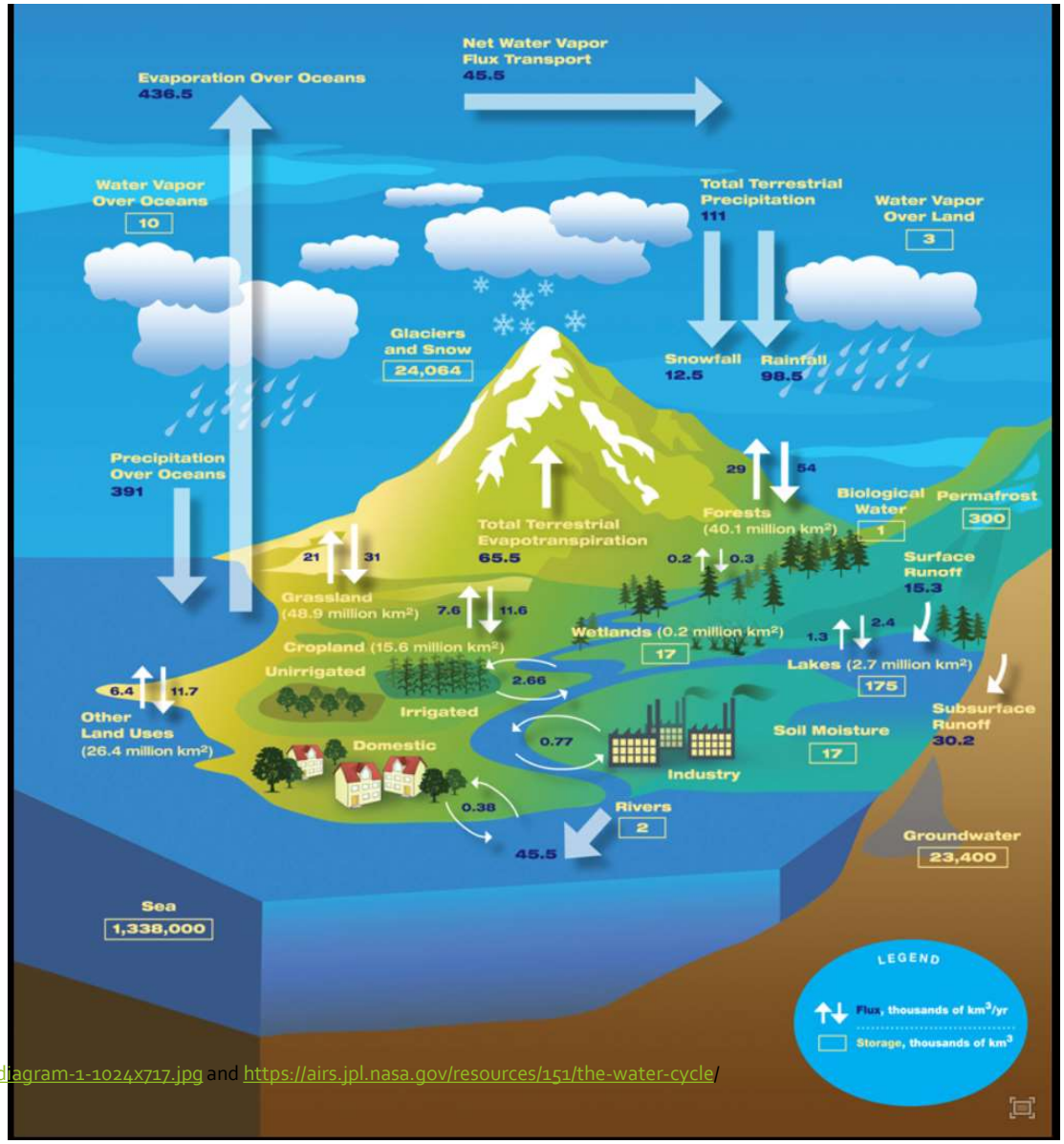
The water cycle

- stocks (sources and sinks), versus

- flows (or fluxes)

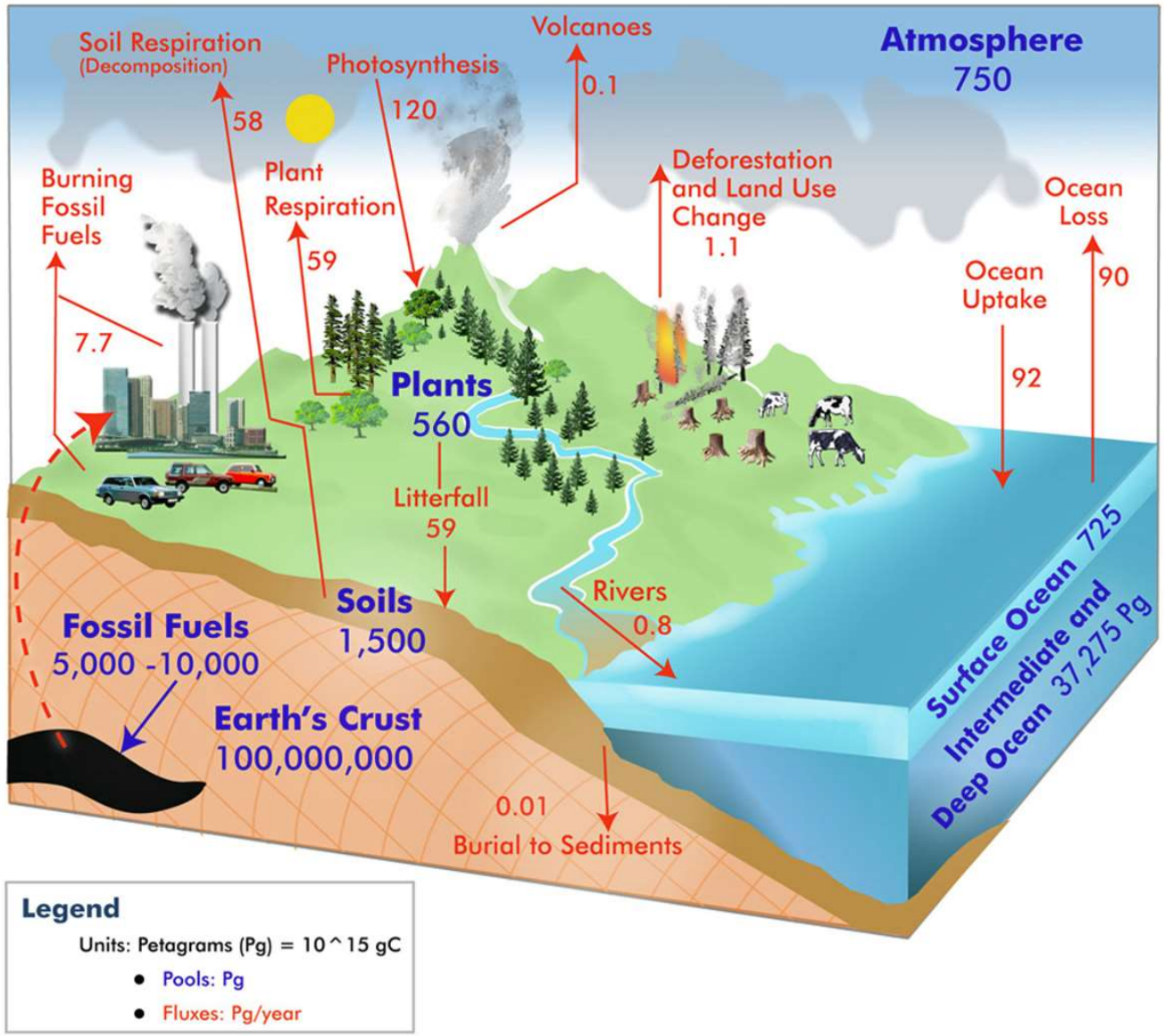
- accounting analogy: balance sheet versus P&L



https://jotscroll.com/wp-content/uploads/2021/09/Water-cycle-diagram-1-1024x717.jpg and https://airs.jpl.nasa.gov/resources/151/the-water-cycle/

Carbon cycle:

"… the continuous movement of carbon, the most abundant element on the planet, through the oceans, land, atmosphere, fossil fuels and all life on Earth."



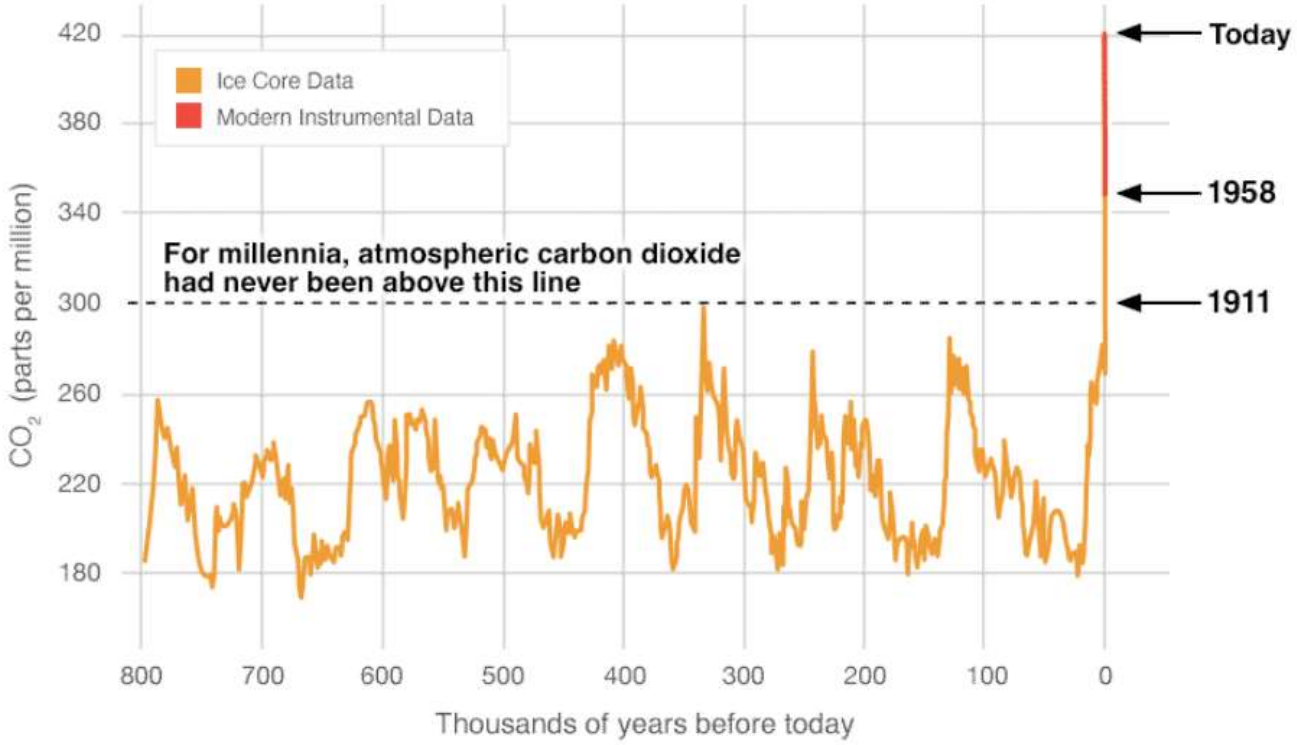
https://airs.jpl.nasa.gov/resources/155/global-carbon-cycle/
see also https://carbon2018.globalchange.gov/chapter/1/

CO_2:

bf 1911 < 300 ppm

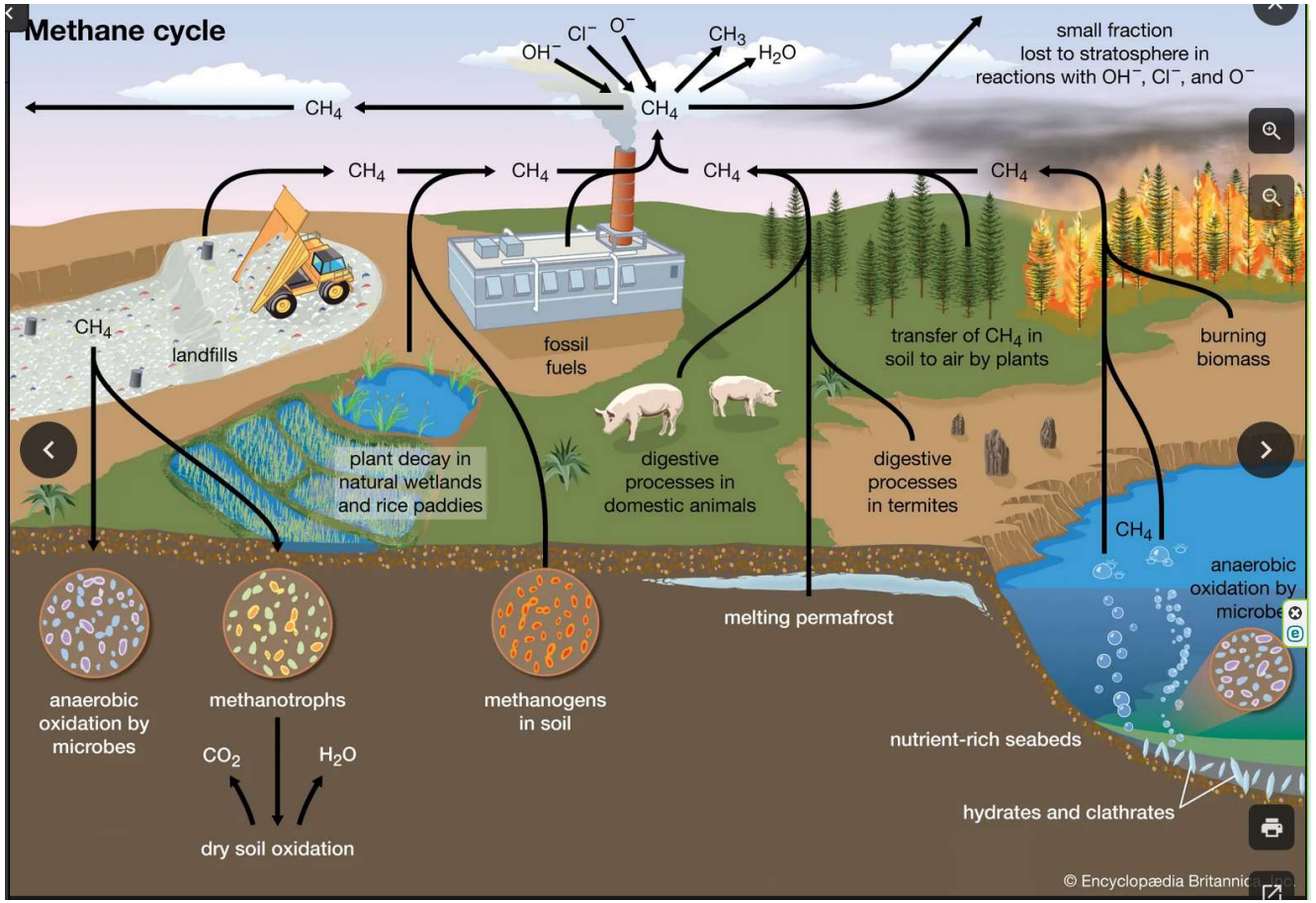
2002 = 365 ppm

2025 = 428 ppm



https://climate.nasa.gov/vital-signs/carbon-dioxide/?intent=121

Methane
CH_4



www.britannica.com/science/greenhouse-gas/Methane

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CO_2equivalent or CO_2e - adding apples with oranges

- Some GHGs are stronger than others ("radiative forcing")
- Some GHGs live longer than others
- So, how can we add a strong, short-lived GHG (like methane) with a weaker but longer-lived GHG (like CO_2)?
- We work out their Global Warming Potential over a defined period

- Covert it to an index where $CO_2 = 1$, that becomes its CO_2e
- Over 100 years, methane is about 27 times "worse" CO_2
- But over 20 years, methane is about 80 times worse
- How much time do we have, what should our focus be?

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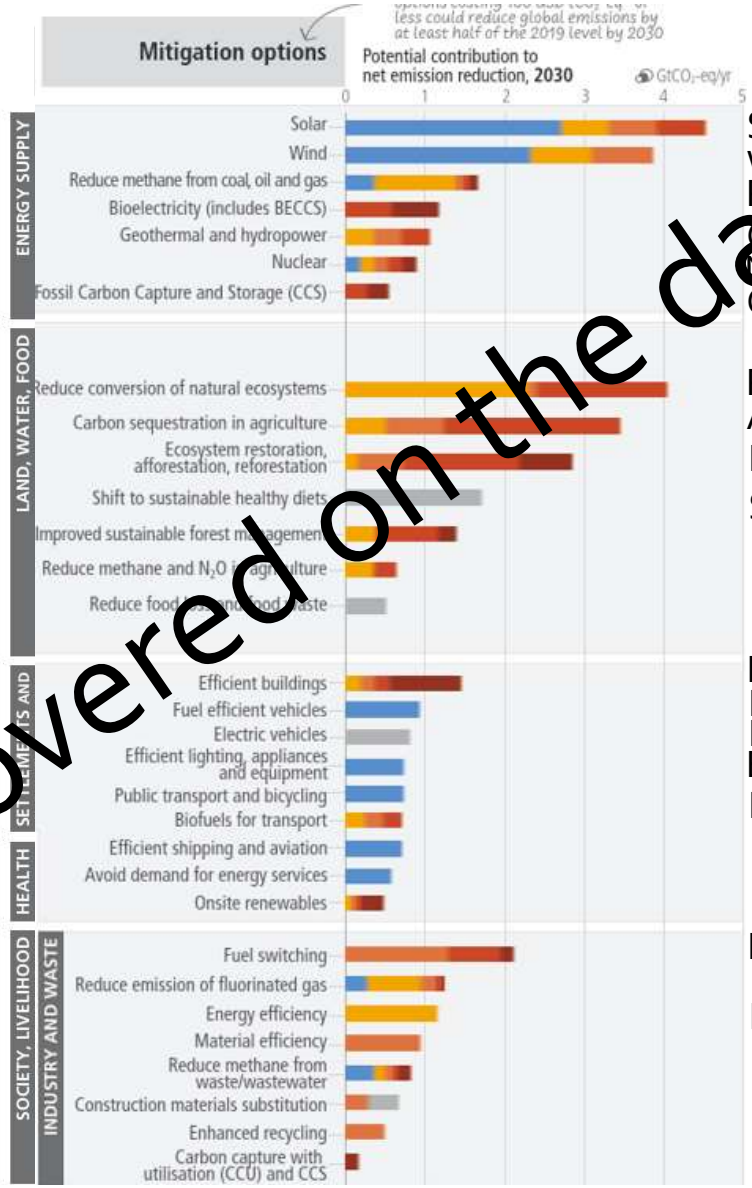
IPCC 2023

Blue = cheap
Red = costly



Solar
Wind
Reduce methane from coal and gas
Geothermal and hydropower
Nuclear
CCS

Reduce deforestation
Agi sequestration
Restore ecosystems
Shift diets

Efficient buildings
Fuel efficient vehicles
EVs
Efficient lighting and equipment
Public transport and bikes

Fuel switching

Energy efficiency

Not covered on the day

https://www.ipcc.ch/site/assets/uploads/2021/12/IPCC-52_decisions-adopted-by-the-Panel.pdf

Any final thoughts?