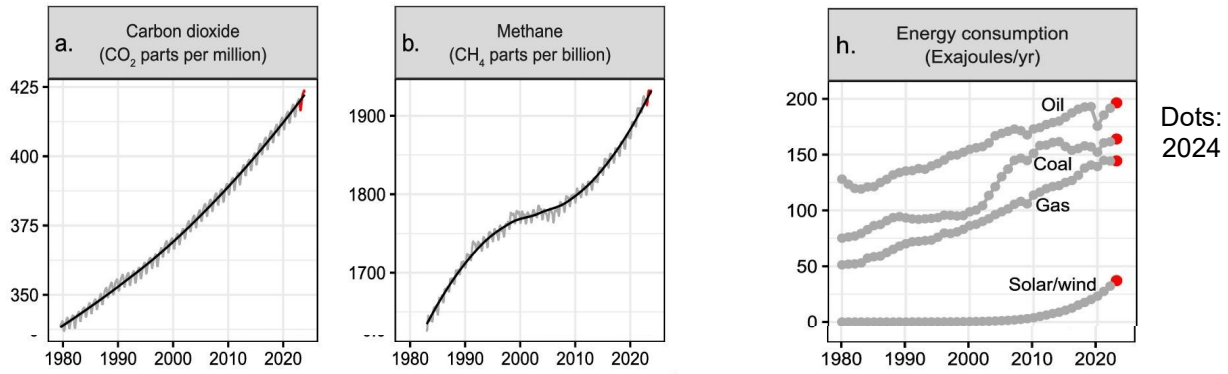
What a state we're in! Let's fix it, fast.

The latest 'State of the Climate' report was published in early October. It makes sobering reading. So many indicators show that the global climate is changing for the worse. On the other hand, there are solutions to this crisis if we are prepared to enact them.

The report shows that average sea temperatures for 2023 and so far this year have been higher than any year since 1991; that the extent of sea ice in both the Arctic and Antarctic has been less over the same period; and the average global surface temperature has also been higher than any other year since 1991. The rise in temperature and the effects of that rise are hardly surprising given that amounts of carbon dioxide and other greenhouse gases pumped into our atmosphere have continued to increase, driven largely by the burning of fossil fuels, the global use of which is still increasing year on year. Indeed, apart from small dip in 2020, the rate of increase of oil and gas has hardly changed over the last 40 years.



(a, b) Greenhouse gas emissions 1980 – 2023. (h) Oil, Coal, Gas and renewable energy (1 Exajoule = 277,000,000,000 kWh) (From The 2024 state of the climate report)

Whilst solar and wind energy are beginning to make significant contributions to our energy demand, fossil fuels (oil, coal and gas) are over 14 times greater. Rather than replacing fossil fuels, renewables are covering the increasing demand for energy.

Many of the processes affecting our environment form feedback loops that enhance global warming. For example, as the arctic tundra warms, the permafrost melts and releases both carbon dioxide and methane, which cause more warming. The melting of ice sheets reduces the infra-red (heat) reflected back into space. The table below shows the most significant physical loops that amplify climate change. There are also biological feedback loops such as the loss of peat lands, forest dieback, wildfires and desertification. Some of these loops involve tipping points such that once they have changed by a certain amount they start to change more rapidly. We have been pushing these factors away from balance towards a tipping point at which they will go into a runaway state that will be harder to control.

Examples of feedback loops that may involve tipping points
(From: The 2024 state of the climate report)

Feedback	**Effect *of* climate change**	**Effect *on* climate change**
Sea ice reflectivity (albedo)	Increasing water vapour	Greenhouse effect
Ice sheets	Sea ice melting of not forming	Decreased albedo
Methane hydrates	High dissociation into methane	Methane released into atmosphere – greenhouse effect
Forest dieback	Loss of Amazon and other forests	Loss of carbon dioxide capture, decreased albedo
Permafrost emissions	Permafrost warming	Carbon dioxide and methane emissions

The Climate Emergency is one of several crises that are degrading the planet and impacting our lives. We have major environmental degradation, rising economic inequality and loss of biodiversity. These are symptoms of over consumption of resources, where we are using those resources faster than they can be replaced, or using irreplaceable ones. For too long, we have been using what the Earth can supply with no concern that it may run out. Governments around the World, including our own, always focus on economic growth but never consider that growth is built on limited resources. Unfortunately, the wealthiest countries have caused the most damage to the global environment but it is the poorest countries that suffer most. Some of the wealthiest countries are doing the least to mitigate climate change.

The key priority is for faster reduction in emissions of greenhouse gases and transition to a clean economy. If we delay, then one or more of the tipping points will be reached with dire consequences. There are solutions! Our farmers are changing the way they farm, particularly regarding land management, reducing the impacts of drought and flood, lessons learnt from African farmers. We are generating more renewable electricity and the last coal-fired power station has shut down. With the right mind-set we will succeed. We have to recognise the climate risk but make full use of the technologies that will avoid and mitigate the worst. But things must happen fast to avoid irreversible climate change.

The 2024 state of the climate report: https://academic.oup.com/bioscience/advance-article/doi/10.1093/biosci/biae087/7808595
See also: World Economic Forum: *These are the top 3 climate risks we face – and what to do about them*. https://www.weforum.org/agenda/2024/01/climate-risks-are-finally-front-and-centre-of-the-global-consciousness/

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