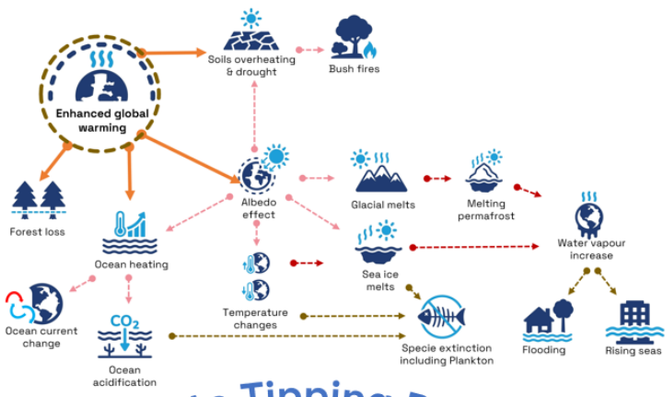
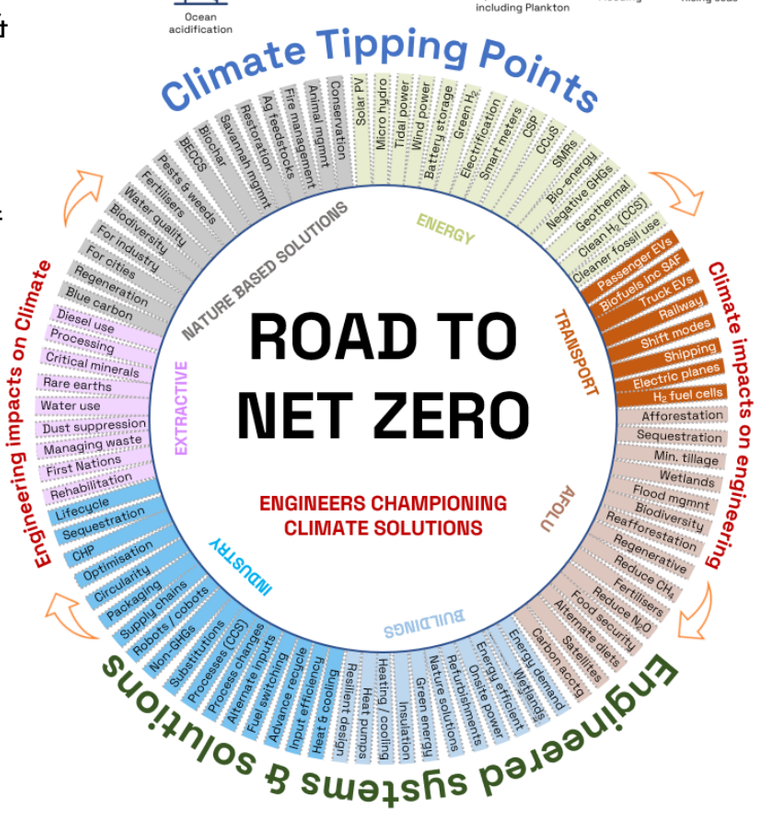
Engineering & carbon crossroads

Informing the Global Stocktake at COP28 through practicable & scalable engineering pathways to safeguard the Paris Agreement's goals

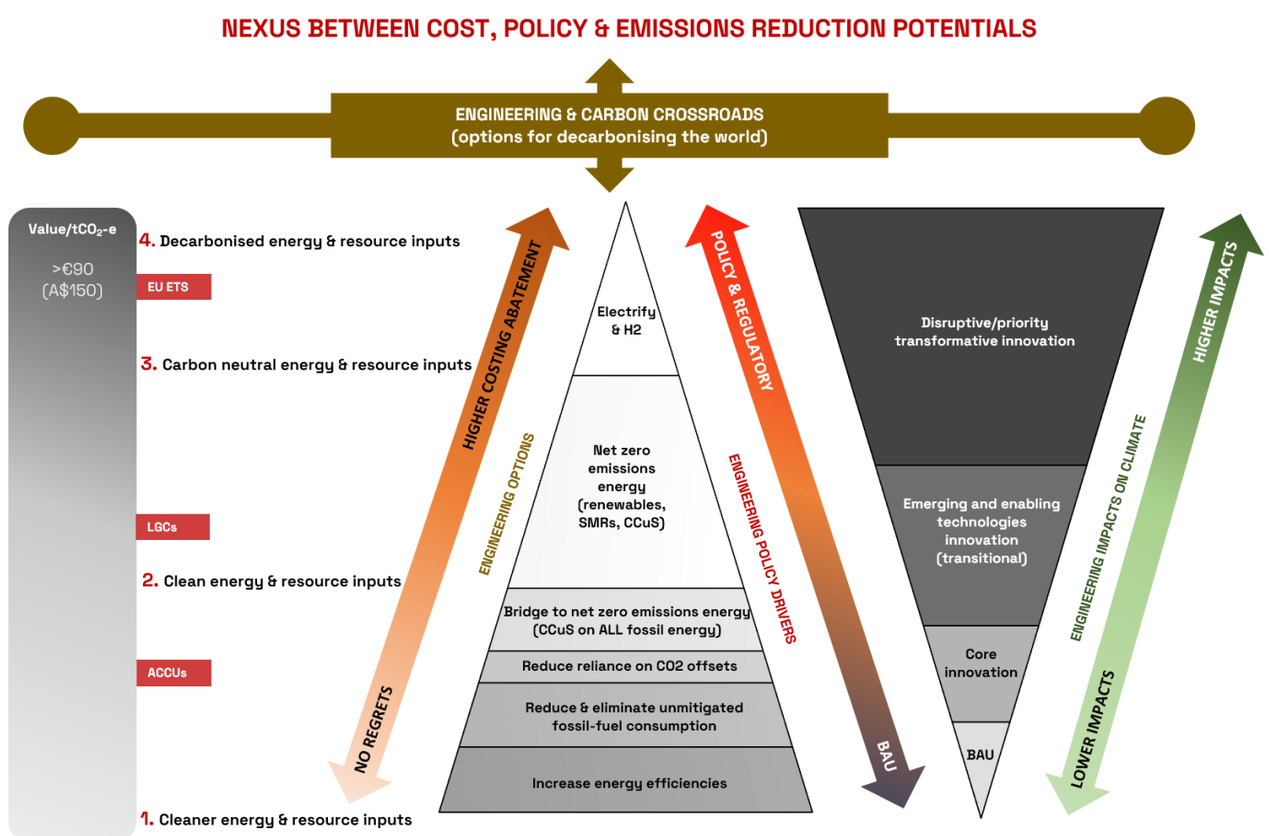
The diagram to the immediate right illustrates a clear nexus between the engineering solutions that can support the complex needs of economic activities, while in parallel, give effect to globally desired climate outcomes & help avoid reaching planetary tipping points.

It is only through applying the scientific knowledge of engineering that technical solutions & sustainable systems can exist in order to safeguard the Paris Agreement's climate goals, as well as enhance the circularity of resource use (including helping end global plastics pollution) while affording a just-transition to a net zero emissions future for all.





The diagram below explores the potential of four critical engineering pathways to achieve net zero emissions by 2050 (at the latest). Their engineering viability depend largely on the sufficiency of government policies & regulations to reduce emissions, to adapt to the impacts of climate change, & to support the health of national systems of innovation.



If it can't be grown then it has to be mined; engineering is needed for both in order to extract & transform the food, fibre, metals, raw materials & primary energy into things that vibrant & sustainable societies need and want.

It is the pivotal role of engineers to safeguard food and energy security, electrify industry, help preserve and regenerate ecosystems, design & bring to market climate-friendly options including electric vehicles that can help enable a more modern, climate resilient & greener-cleaner global economy.

The effect of emissions limitations & reductions as outlined in Nationally Determined Contributions (NDCs) depend on the baselines from which they are measured. The ability to accurately assess, measure, estimate, monitor, validate & disclose emissions performances with high integrity is heavily reliant on engineering best practices & technical standards.

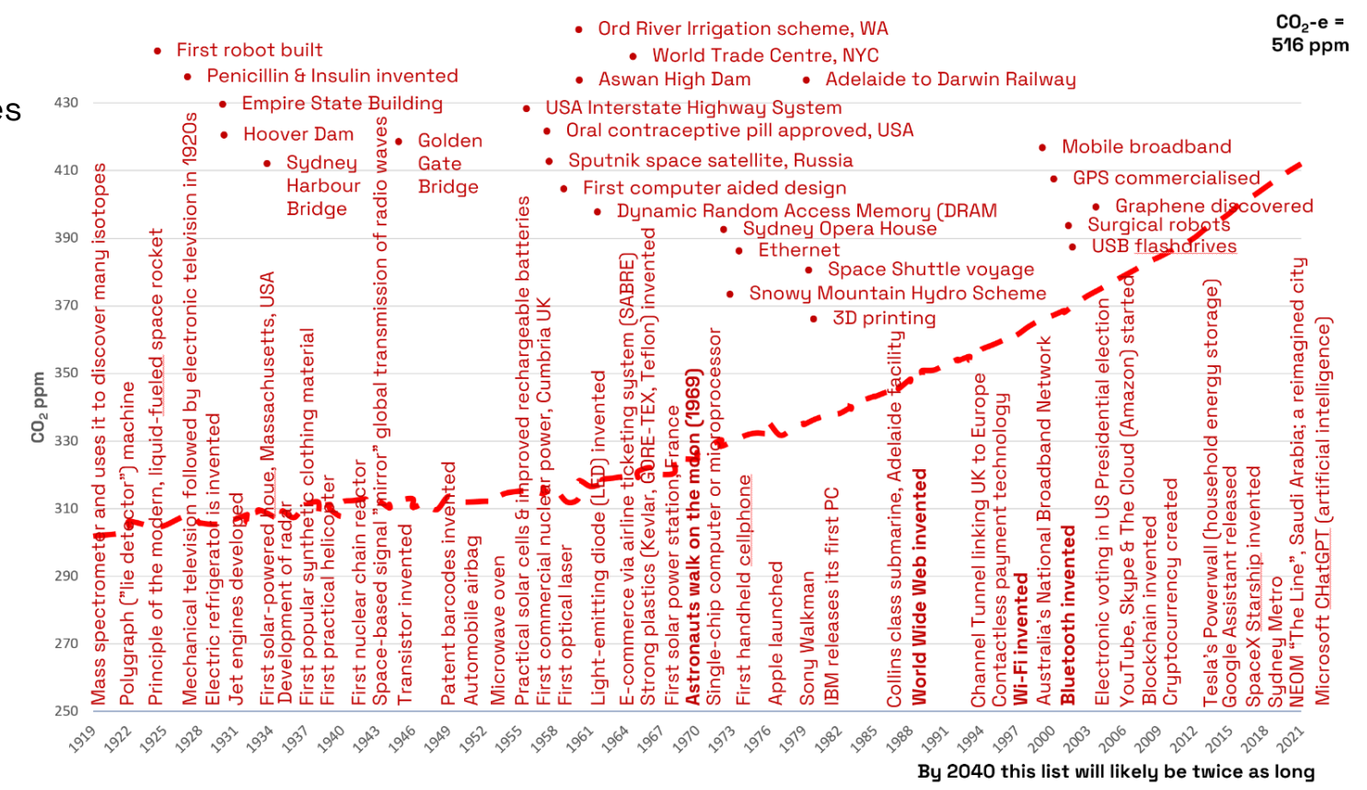
The economic incentives provided for under Article 6 (carbon markets & non-market approaches) & which are considered essential to efficiently, equitably & dependably mobilising the global economic resources required to drive decarbonised & climate resilient futures are also only possible through engineering.

This includes the digital platforms that underpin the environmental & financial integrity of potentially millions of daily emissions allowance transactions by tracking & acquitting them real-time within & across national & international registries.

These pathways can only become a reality if nations have access to the engineering competencies & skills needed to deliver on what are often referred to as the global clean energy transformation & digital revolution.

The role of all STEM professionals in collectively tackling climate change is of paramount importance. It is essential that nations invest in capacity building to develop & enhance national climate-relevant competencies & skills to ensure that they can continue to foster innovation & leverage synergies that exist between all countries in driving meaningful climate action & ensuring sustainable economic growth.

Engineers Australia turns 104 years young in 2023, & the chart below shows a sample (only) of some of the great engineering innovations in its lifetime. However, when overlayed with levels of atmospheric greenhouse gas concentrations, it becomes clear that some are either directly or indirectly associated with unacceptable carbon legacies going forward. Engineering can, must & will rise to the challenges presented by the world's biggest problems, and this includes addressing climate change.



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