

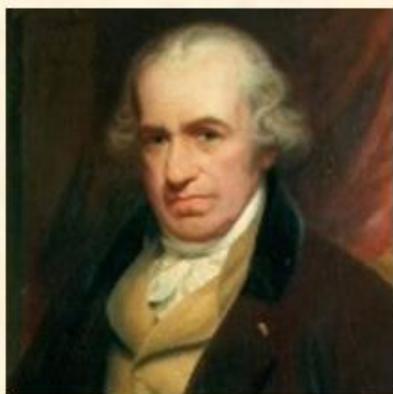
Has it All Come Too Late?

Previously, I have suggested that energy is valued far too cheaply. It is time to develop that argument a little further. In very simple terms, there is a relationship between scarcity and price. If something is rare and sought after, its price will be high. If something is abundant, its price will be low. If the price is low, then the thing will be taken for granted, it will not be highly valued. We need to explore further the difference between the 26p per kWh that is the current charge for electricity and the £462 per kWh that would be the charge if the electricity came via a munch line, i.e. was generated by paying the current minimum wage to a labourer for, in effect, powering a bicycle generator.

In simple terms, 1.361 kWh of solar energy falls directly on each square metre of the earth's surface (the so-called "solar constant"). Now the Earth's surface is made up of a very large number of square metres (510 trillion is, surprisingly, an accurate figure). So, in theory, the energy provided by nature ought to be very abundant indeed. The problem is with the way we capture this energy and turn it into useful work. Munch lines are hopelessly inefficient. Very little of the Sun's energy gets to the end of a munch line as useful work. A human labourer, or for that matter a horse, is at the end of a very inefficient energy transfer system and humans, even the very best athletes, are weak and feeble machines.

Humans have been magnifying the amount of work ("work" as in physics) they can do by harnessing more energy from the Sun than other animals are able for a long time. It is recorded that mechanical power obtained from the wind to pump water and grind corn was in use in 9th century Persia¹, though the use of simple sails long predates that. The great Roman engineer, Vitruvius, described practical ways of capturing the power of the Sun in the form of water raised to fall and drive a wheel in 25 BCE². History, though, reveals a catastrophic set of circumstances. Barely a hundred years separates Thomas Newcomen and James Watt from Michael Faraday and Hippolyte Pixii. Had the latter two been born before and not after the former two, humankind might have learned how to send wind and water power to remote machinery in the form of electricity. What looks to have become the catastrophe of fossil powered machinery might have been averted.

A critical one hundred years that could have happened the other way round?



1664-1729



1736 - 1819



1791 – 1867



1808 - 1835

Those hundred years may have sealed the fate of generations, but is it too late to turn back? James Watt was a contemporary of another great thinker of the Scottish enlightenment, Adam Smith.

Though increased wealth would have figured amongst the factors motivating these enlightenment thinkers, could any of them have foreseen the pathological, unbridled greed of drill, baby drill and the oil profits that have long preceded the current most unfortunate of all the US presidencies? The enlightenment was a time when prominent thinkers imagined expanding wealth would cultivate civility and



rational self-restraint (perhaps leading to at least a degree of social equality). At heart there is the core question of human nature that drives the values and value systems that are dominant in societies across the global north. It is hard to see that our grandchildren and their children (those that survive) will look back on the two hundred years between 1830 and 2030 as an age of civility and rational self-restraint, despite the supposed virtues and moral values of the Victorian era. Two hundred years without the necessary civility and self-restraint has now resulted in our hoping for social and political tipping points to counter the ecological and climatic tipping points we know are otherwise coming.

The term “tipping point” may well be familiar. Elsewhere on this site I summarised the ecological tipping points identified by the UK government’s National Security Assessment (last updated February 2026). To save you searching, here’s that summary again.

	Ecosystem	Period
From 2030 onwards	Coral reefs of S.E Asia	Within ten years
	Himalayas	50 – 1000 years
	Boreal Forests of Russia and Canada	40 – 100 years
From 2050 onwards	Amazon Rainforest	50 – 100 years
	Congo Basin	uncertain
	Mangroves of S.E. Asia	uncertain

Tipping points do not have to be not just ecological or climatic. They may be social and indeed political though the prospects for positive ones are currently slender. I continue to read many academic papers by highly capable scientists and have noted a certain convention that has developed in their composition. All forecast some form of ecological/climate overshoot and differ only over matter of degree and uncertainty range. Most also conclude with some form of formulaic caveat to the effect that “it is not too late if urgent steps are taken to curb CO₂ emissions”. Nowhere is this more evident than in Tim Lenton’s excellent book *Positive Tipping Points*.³ Lenton devotes the first section of his book to a comprehensive analysis of impending tipping points as dire as any. The second section of the book sets out several case studies in which the actions of one or more individuals could potentially set in motion the necessary changes that governments seem to have been incapable of making.

Unfortunately, Lenton’s own analysis appears to suggest that governments have become incapable because leaders have become “either paralyzed by the complexity of the situation or [are] actively trying to maintain the status quo”.⁴ The reason he gives is that governments still think linearly whereas what is happening is happening exponentially and requires, therefore, an urgent “tipping point” response. (Another way of saying this might be to state that governments need in practice to understand the meaning of “emergency” as applied to climate). Lenton’s analysis of linearity in

government action is undoubtedly accurate, but he does not mention that governments are restrained by the values of those that elect them. Nowhere is this more potent than in the case of the world's largest polluter which has twice elected a backward-looking administration that values highly the extraction of fossil fuels whilst simultaneously placing a strong negative value on sustainable or renewable alternatives.

It is going to take some time for this huge juggernaut to change direction even assuming wiser councils eventually prevail upon electorates (and unelected leaders), and we know that even the most optimistic climate projections already have overshoot built in. Lenton uses the metaphor of a giant oil tanker. Even if the engines (CO₂ emission being the main engine) are immediately cut, the ship is going to continue moving for several decades to come. Despite the encouraging case studies he presents I find it difficult to conclude anything other than "yes, initiatives such as negawatts and killerwatts have all come too late." It is within the bounds of theoretical possibility that most future humans could have lived affordably and almost indefinitely in a reasonable degree of comfort and security had the inventions of Faraday and Pixii born full fruit before those of Newcomen and Watt, but this has not been the course of history.

So, if it is all too late, what are we to do? It seems to me that there are but two main avenues of response:

- Make no plans to repay the debt owed to nature for fossil fuels, live for the present, maximise wealth whilst it is still possible to do so, rationalise the consequences of extreme heat through denial, and give little to no thought about the needs of future generations.
- Accept that we are going to have to repay the fossil fuel debt to nature and brace ourselves for how much it is going to be. Then make sensible plans for repayment whilst continuing with renewed vigour the not unsuccessful path of climate change mitigation so far trodden. We *have* the knowledge to do this, so it is a gross dereliction of duty not to prioritise passing it on with urgency to the upcoming generations whilst giving them as much as we can the tools to live in a very different world.

I have yet to see credible scientific evidence that any form of "cakeism", cherry-picking of the best bits of both is possible.

****Isn't this fundamentally a question of values? Which values will become our reasons for action?***

¹ Hassan, A. and Hill, H. (1986). *Islamic Technology: An illustrated history*, p. 54. Cambridge: Cambridge University Press. [Cambridge University Press](#). ISBN 0-521-42239-6.

² Vitruvius (2007) The Ten Books on Architecture, Project Gutenberg, [The Project Gutenberg eBook of Ten Books on Architecture, by Vitruvius](#).

³ Lenton, T. (2025) *Positive Tipping Points: how to fix the climate crisis*. Oxford: Oxford University Press.

⁴ _____ Lenton, p11.