Last chance for the climate transition

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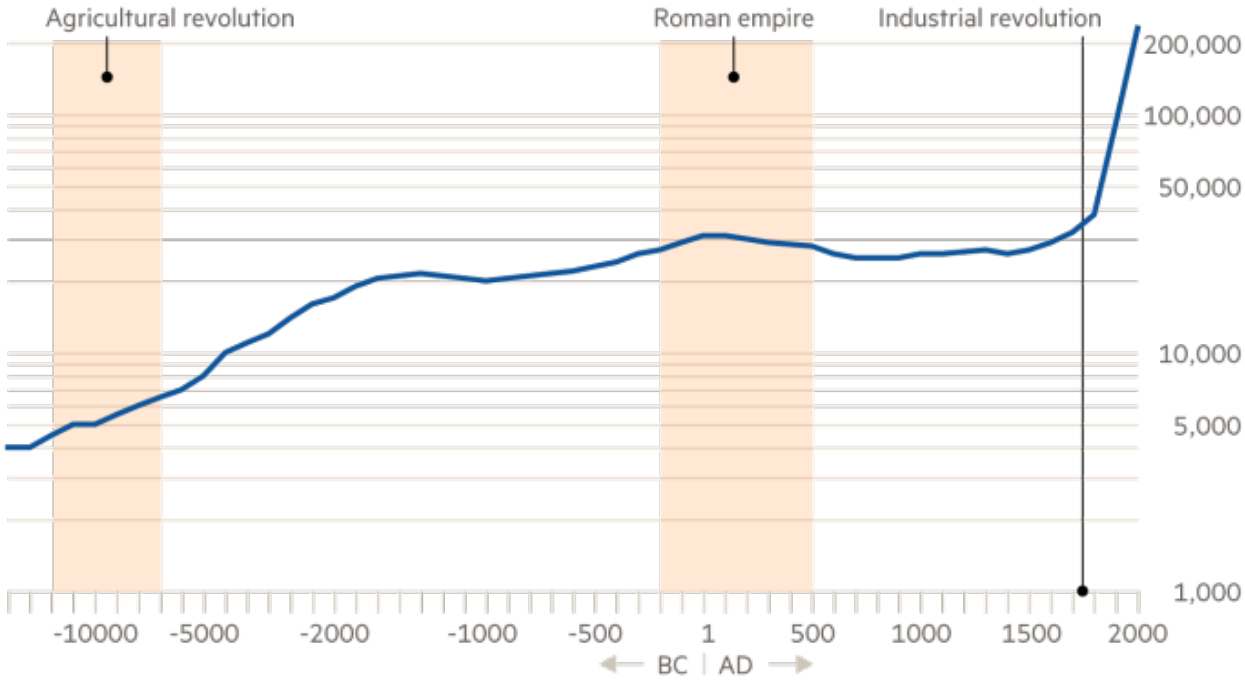
Martin Wolf, *The Financial Times*, February 18, 2020

At the World Economic Forum in Davos this year, two people stood out: Greta Thunberg, the 17-year-old Swedish climate activist, and Donald Trump, the US president. In their messages on climate change, these two could not have been more opposed: panic, confronted with indifference. But one thing they share is that they are not hypocrites: Ms Thunberg does not pretend we are doing anything relevant; Mr Trump does not pretend he cares. Most participants in the climate debate, however, pretend to care, pretend to act, or both. If anything is to be done, this must change.

Ours remains what it has been since the early 19th century: a fossil-fuel civilisation. There have been two energy revolutions in human history: the agricultural revolution, which exploited far more incident sunlight; and the industrial revolution, which exploited fossilised sunlight. Now we must return to incident sunlight — solar energy and wind — along with nuclear power, while maintaining our high standards of living.

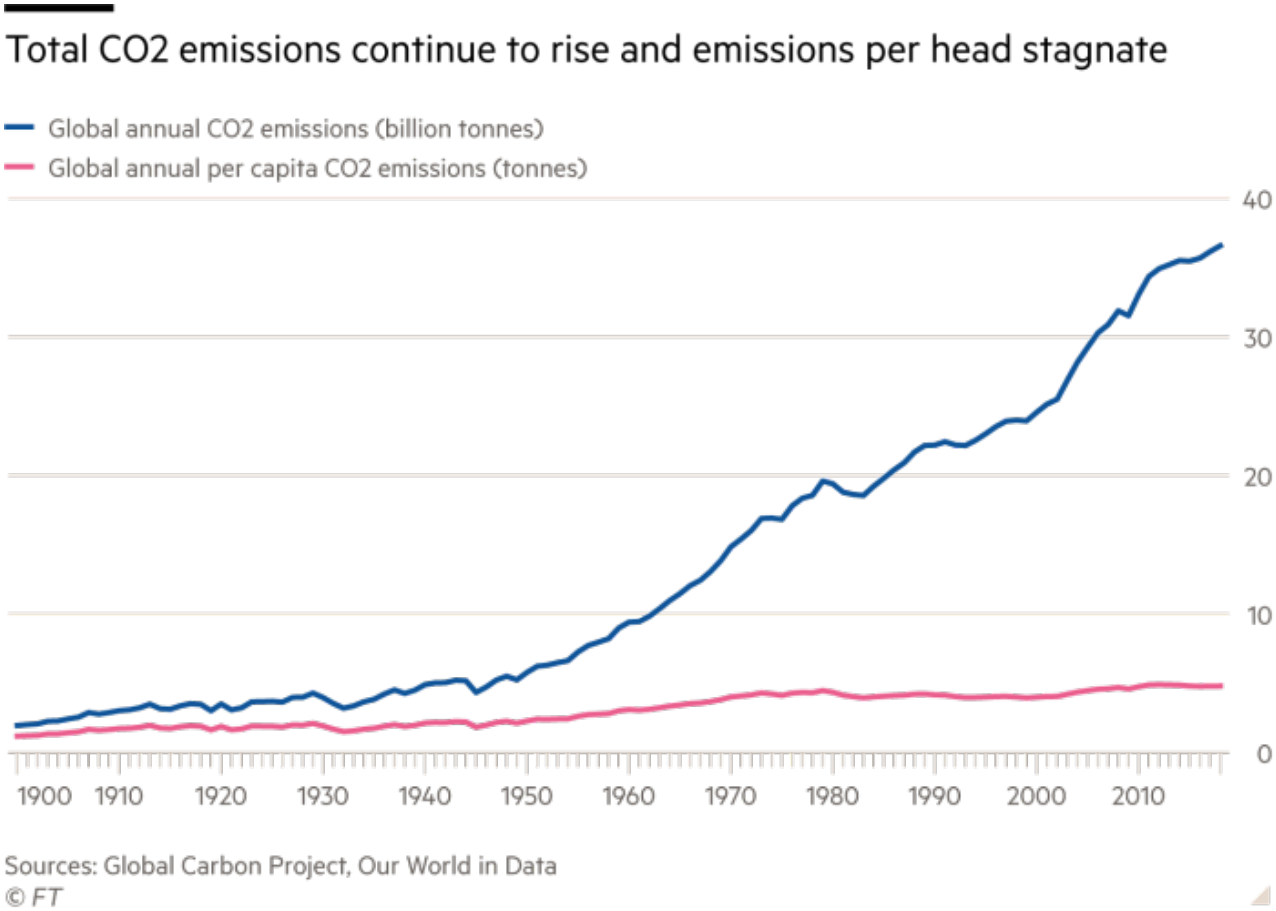
The rise of human energy capture

Energy capture per head per day of leading western economies (kilocalories, log scale)



Source: Ian Morris, Social Development, October 2010

The point of this latest energy revolution, however, is not to raise our standard of living directly, but to preserve the only home we know in the state to which life is now adapted. It is to avoid an irreversible experiment with the climate of our planet. So far, however, despite decades of talk, trends in emissions remain in the wrong direction.

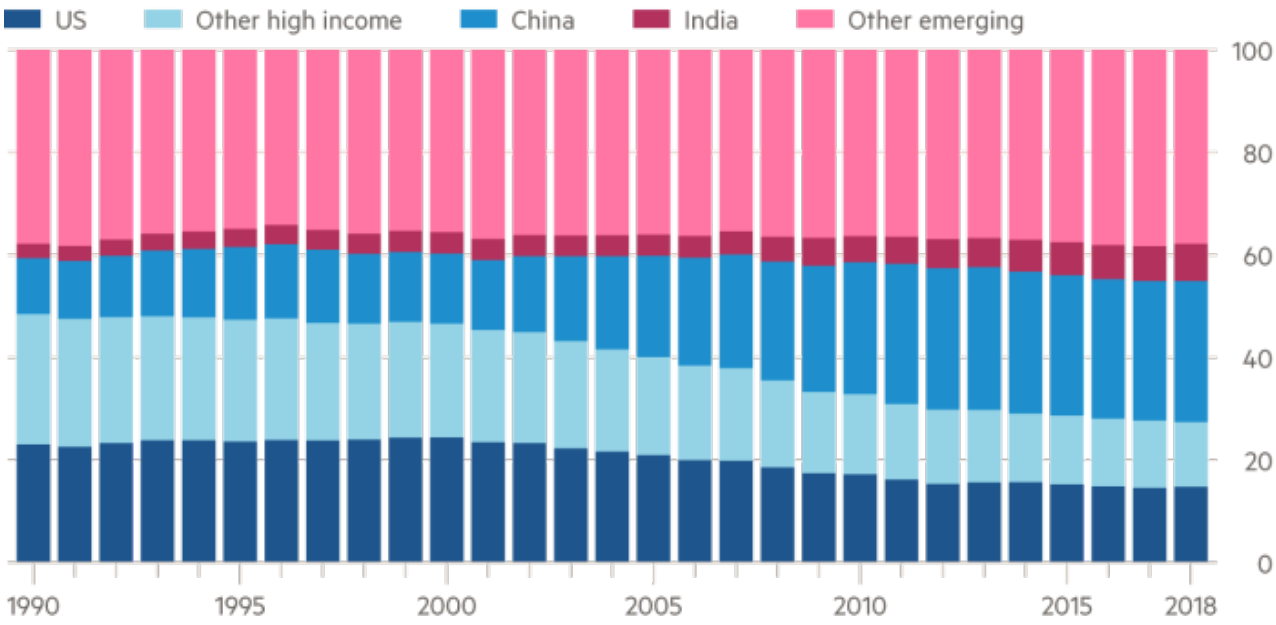


What is to be done? Discussions last week at the Oslo Energy Forum clarified things for me. My principal conclusion was that a transformation from our current energy system to a different one is the only option. Some suggest we should halt growth as well. But this would not only be impossible, it would also not be nearly enough.

Over the past three decades CO2 emissions per unit of global output have been falling at a little below 2 per cent a year. If this were to continue and world output were to stagnate, global emissions would fall by 40 per cent by 2050 — far too little. Relying on actual reductions in output, in order to cut emissions by, say, 95 per cent, by 2050, would require a fall in world output of roughly 90 per cent, bringing global output per head back to 1870 levels.

Emerging and developing countries now generate close to two thirds of emissions

Share of global annual CO2 emissions (%)



Sources: Global Carbon Project, Our World in Data
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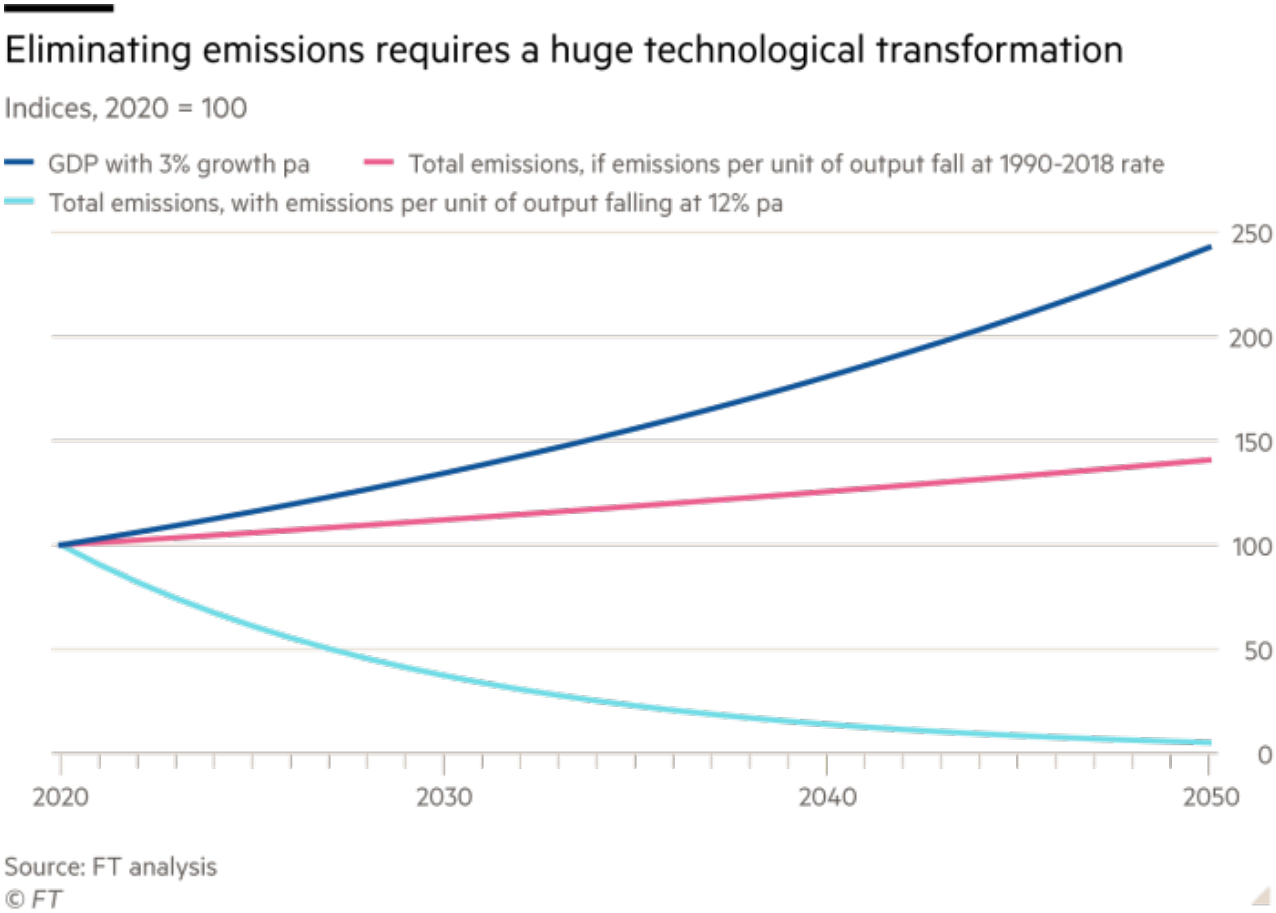
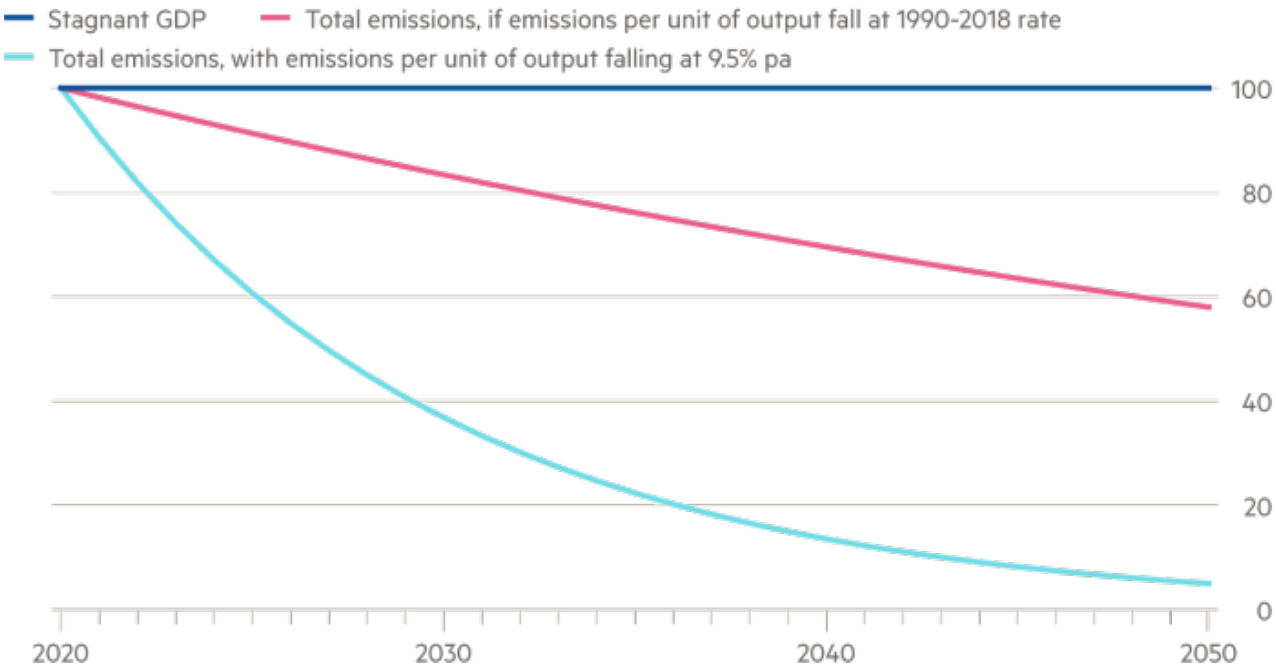
The conclusions are simple. We will *not* stop relying on fossil fuels by choosing universal impoverishment. But we also cannot stop using them soon enough, at our present glacial rate of reduction in emissions per unit of output. So we must massively accelerate technological progress away from burning fossil fuels. We must move beyond them almost completely. If we do achieve that, the size of our economy ceases to be the issue: however big it becomes, it ceases to emit greenhouse gases. But note: to achieve this by 2050, the rate of reduction of emissions per unit of output needs to jump massively.



Is this achievable? From a technological point of view, it appears so. So, at least, argues the Energy Transitions Commission in a number of important reports. The essential ideas are simple. The core of the new energy system is electricity generated by renewable means (solar and wind) and nuclear power. This needs to be backed up by a variety of storage systems (batteries, hydroelectricity, hydrogen and natural gas, with carbon capture and storage). Reductions in costs have already been large enough and technological progress rapid enough to make this transition feasible, at manageable cost.

Global economic stagnation would not solve the climate challenge

Indices, 2020 = 100



Source: FT analysis
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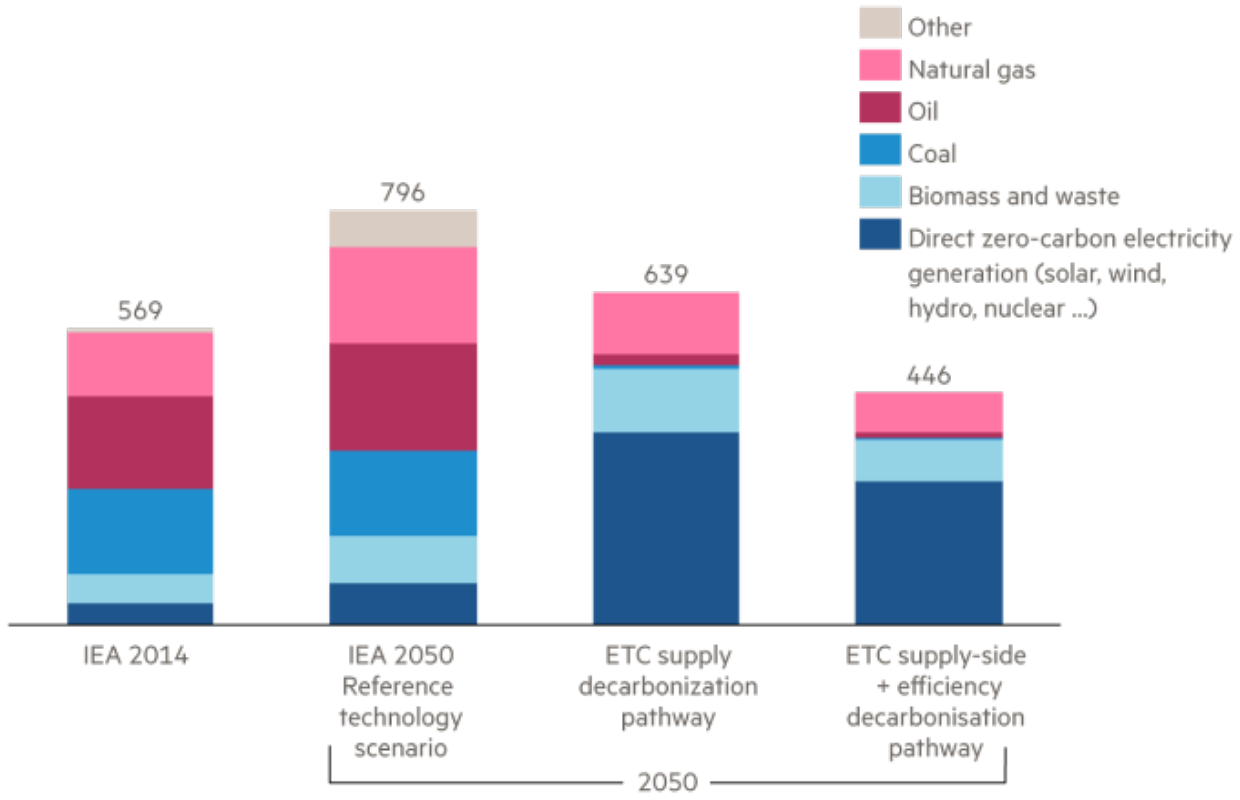
This would, however, be a revolution. A zero-carbon economy would require about four to five times as much electricity as our present one, all from non-carbon-emitting sources. In running such an economy, hydrogen (much of it produced by electrolysis) would play an essential role. Hydrogen consumption might jump 11-fold by 2050.

In many sectors, the costs of decarbonisation are (or soon will be) competitive. Yet in some, they will not be. There will need to be incentives and regulations to force the shift. In order to avoid merely moving production, in its most emissions-intensive forms, elsewhere, it will be essential to impose offsetting taxes on imports from jurisdictions that refuse to support the needed changes.

The needed shift to the electricity economy

Primary energy demand in a zero-carbon economy (exajoules per year)

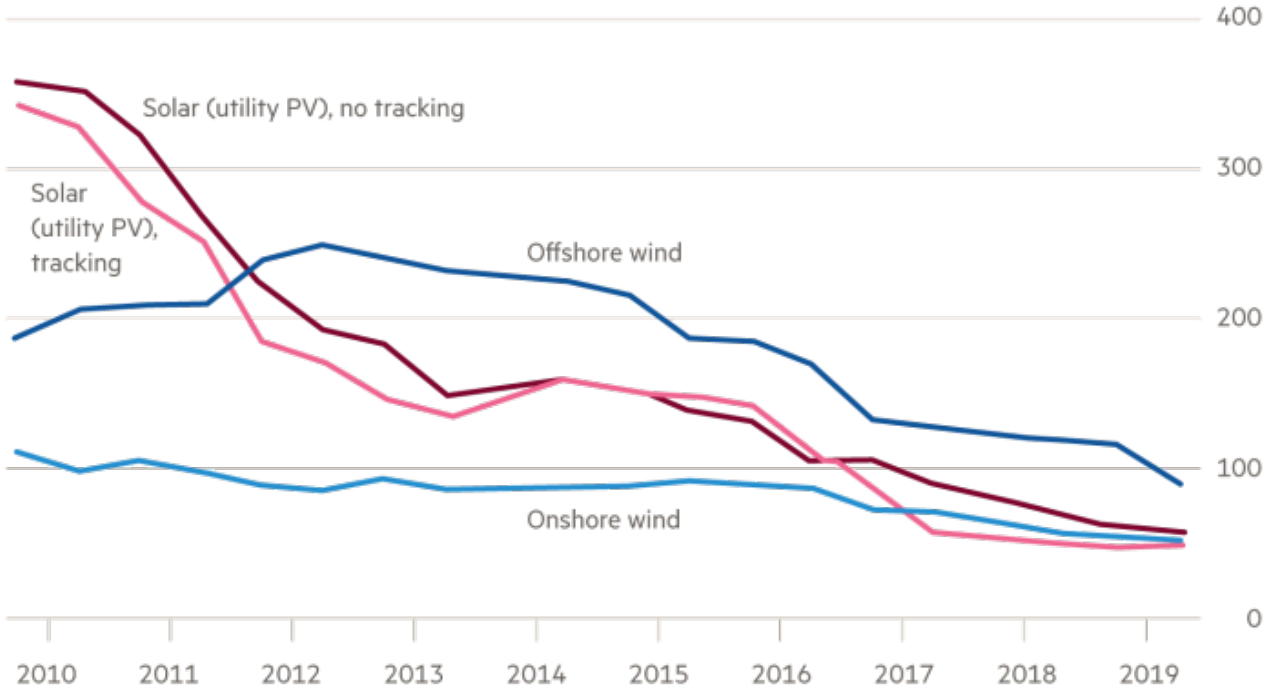


Sources: International Energy Agency; Energy Transitions Commission

Suppose that a transition towards a global zero-emissions economy by 2050 is indeed technically feasible. That does not mean it is likely to happen as a result of purely economic forces. This is so for two main reasons. The first is that the cost advantages of the decarbonised alternatives are, in many areas, at best modest. These are not (at least not yet) close to being dominant technologies in all relevant areas. The second is that there is always huge inertia in making shifts to new technologies, especially in areas where familiar methods and systems are to be replaced by entirely new ones. We know very well how to run a fossil-fuel economy reliably and at vast scale. A reliable, entirely renewable energy-economy is an unfamiliar beast.

The falling costs of renewable electricity

Global average levelised costs (Real 2018 $ per MW hour)

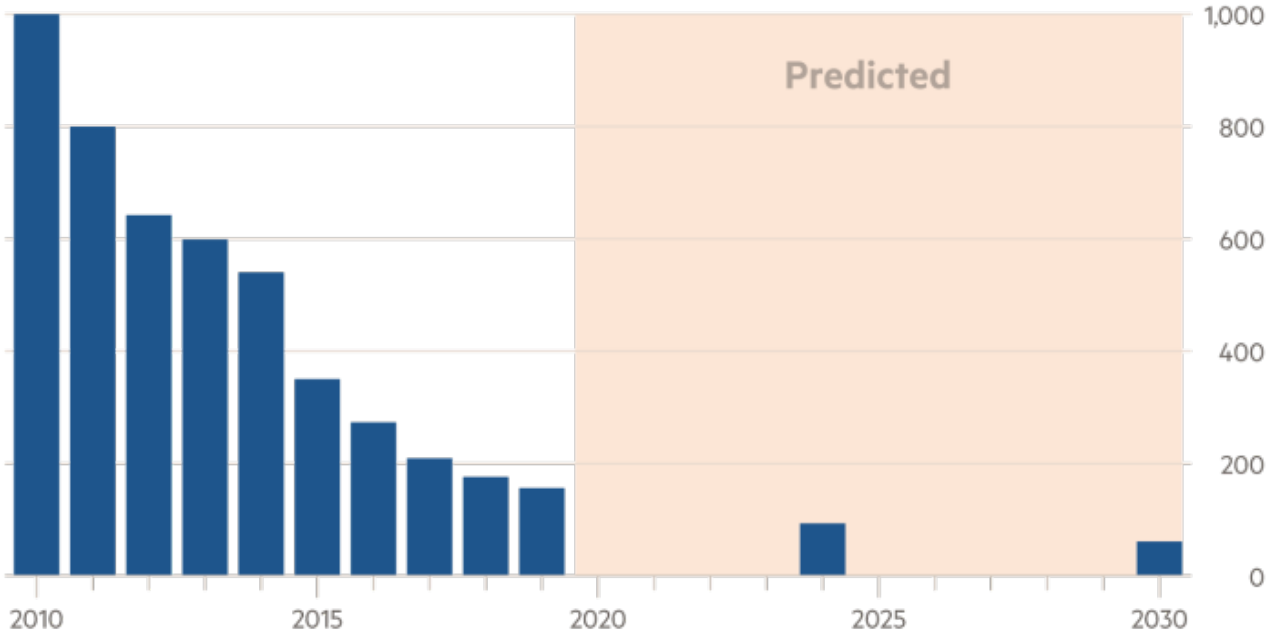


Source: Energy Transitions Commission

A global systems transition of this scale will not happen by itself. It will require large-scale policy interventions, via a mixture of regulation, incentives and government-supported research and development. It will require global co-operation and clear recognition of the very different positions — in terms of past behaviour, present responsibility and future needs — of the countries of the world. It will take changes in finance and accounting. It will, in short, take a historic global effort of a kind we have never seen before to avoid a danger that still seems remote to the vast bulk of human beings.

The cost of batteries has collapsed

Battery pack prices ($ per kw hour of storage)



Sources: Energy Transitions Commission, Bloomberg
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This does need to be done. But will it be? Ms Thunberg fears our inaction. Mr Trump is one of the reasons why she is right to do so. We have so much to do and so little time. If we are to succeed in halting climate change, we have to change course now.