OPINION

Peak emissions are closer than you think

Fossil fuel emissions will peak and then decline during the coming decade, according to *Michael Liebreich*, Chairman and CEO, Liebreich Associates. However, it will be a modest decline, perhaps 5% by 2030, not enough to meet the goals of the Paris Agreement. Despite this, he sees reason for optimism.

Here we stand, at the start of a brand new decade. The prevailing spirit is one of pessimism about the world, about climate change among other issues. However, on that score at least, I believe we are about to surprise ourselves. The coming decade will see emissions peak and begin to fall.

Global CO_2 emissions have grown 63% since the 1992 Earth Summit, which saw the creation of the Intergovernmental Panel on Climate Change (IPCC). Over the past decade alone, emissions have grown 15%. However, this needs to be compared to the 162% by which the world economy has grown since 1992, and 45% over the past decade.

The trend towards the decoupling of emissions from economic activity has been picking up steam. Since 2013, the global economy has grown by 23%, while CO_2 emissions from energy have grown no more than 3%.

Energy efficiency

If we are to see peak emissions in the next decade, we urgently need to improve our energy productivity. This is the goal of the International Energy Agency's (IEA) Global Commission for Urgent Action on Energy Efficiency, on which I serve.

At its inaugural meeting in December 2020, we learned three things – first, that energy efficiency is finally gaining recognition as a national priority in many countries, whether for climate or energy security reasons. Second, that there is as much 'low-hanging fruit' in energy efficiency today as there ever was. And third, there is a far better understanding of how to pick that fruit than there was a decade ago.

The goal is to build a coalition of countries committed to improving energy productivity by 3% per year, for the foreseeable future.

Towards a renewable singularity

One of the most stunning developments in the global economy over the past decade has been the plummeting cost of clean energy technologies. The cost of solar power and lithium-ion batteries fell 85%, onshore and offshore wind by around 60%, and LED light bulbs by 97%.

Bloomberg New Energy Finance (BNEF) has concluded that around two-thirds of the world's population now live in countries in which wind or solar are the lowest-cost ways of generating power. And although the rate of cost reductions may slow as markets scale, learning curves never stop working. The world record levelised costs for wind and solar power today stand at $17/MWh, the lowest cost of new electricity from any technology, ever. By 2030, I have little doubt they will both be below $10/MWh.

The big unanswered question, as renewable penetration grows, is whether the cost of managing the intermittency of wind and solar power will drop, as its supporters believe, or surge, as its naysayers insist. It's a vital question, which will decide whether wind and solar can maintain their historical growth rates, or whether their penetration must soon saturate. All the main energy models are designed around the idea of renewable energy saturation growth rates decelerating into the future – whether abruptly or slowly, but always markedly decelerating. The IEA's central scenario, Stated Policies (SPS), has the combination of wind and solar reaching only 24% by 2040. BNEF's New Energy Outlook model, always more bullish, shows them at 39% in 2040 and 48% by 2050. What would it take for them to be wrong? What if learning, innovation and the co-evolution of demand-side industries continue to win the race against the physics of intermittency, and the growth rates of the past few decades continue?

The contribution of solar power to global generation has doubled nearly nine times in the past 18 years; another seven doublings and it would meet the entire current global electricity demand. Wind has doubled five times in 18 years; another five doublings and it too would meet our entire current demand.

Five enablers

To enable this sort of renewable energy singularity, five things are needed. The first would be the exploitation of all the flexibility already latent in our current power systems, and then build more, in the form of power storage, demand response, long-distance interconnections and linkages

with transport and heat.

Second, would be to learn to love overcapacity. Whenever technology is cheap, and demand or supply are intermittent, we overbuild. Today, the average capacity factor of the world's hydro plants is 42%; gas peaking plants 15%. Even the so-called baseload coal plant runs only 54% of the time. Wind and solar will be no different.

Third, would be significant electrification of transport and heating. Nobody doubts this is on the cards – Daimler Benz has ceased working on the next generation of internal combustion engine (ICE) for the first time in 135 years. Meanwhile, heat pump sales have increased 12%/y for the last decade.

Fourth, would be the electrification of industry and the generation of green fuels, be they hydrogen, ammonia or liquid fuels like methanol. Rapid reductions in renewable energy and electrolyser costs suggest that green hydrogen (based on renewable power) will start to be competitive with brown hydrogen (from steam methane reforming) by 2030. By 2050, the combination of cheap green hydrogen and a $100 carbon price would create an addressable industrial market accounting for no less than 30% of current global emissions.

The fifth enabler of a potential renewable singularity is storage. By 2030, electric vehicle (EV) batteries will cost around $65/kWh at the pack level. That's $6,500 worth of batteries for a full-sized vehicle with a range of 300 miles; $13,000 gets you a 600-mile range – more than most drivers ever need. Lithium-ion technology will also continue to progress towards the 10,000-cycle 'million-mile EV battery'. This enables cars with 50-year lives, profitable vehicle-to-grid business models, and the scaling of second-use battery applications. This will be a gamechanger – even before considering the potential breakthrough impact of solid-state batteries, offering four-times the energy density and enabling swarms of electric planes and other extraordinary innovations.

Taking care of business

Another reason for optimism – over the past 24 months corporate executives have been grappling with the issue of climate change as never before.

European oil and gas companies have clearly got the message. Spain's Repsol is among the most ambitious, promising zero net emissions, including Scope 3 (those embedded in the oil and gas it sells), by 2050. Shell has committed to reducing the carbon intensity of each unit of energy it sells by 20% by 2035, and by 50% by 2050. Equinor is targeting net zero from scope 1 and 2, and 50% lower carbon intensity in its products by 2050. In February, BP dropped a bombshell by promising net zero from its operations as well as from all the oil and gas it extracts by 2050 or sooner.

Meanwhile, analogous conversations are playing out across banking and investment. Managers of $120tn of assets have agreed to follow the principles of the Task Force on Climate-Related Financial Disclosures (TCFD) set up by Mike Bloomberg and Mark Carney, outgoing Governor of the Bank of England. Every major financial centre has an initiative on green finance. In January, Larry Fink, CEO of the world's largest asset manager, BlackRock, captured the zeitgeist when he announced that climate change will reshape the world of finance.

In the land of the fossils

Where does this leave fossil fuels? We keep hearing that India and China alone have between them a pipeline of new coal plants, equivalent to 15% of current global capacity. However, what matters is not generating capacity, but how much coal will actually be burned.

Around the world, capacity factors are falling. Globally, coal consumption has been flat since 2012, and figures for 2019 show a drop of around 3%. In the EU, eight out of 28 countries have already committed to phasing out coal by 2030; Germany has promised 2038; coal will be entirely gone in the UK by 2025. The EU's recently announced Green Deal included €35bn of support for Poland and other countries to get off coal.

The war on coal is over, and coal has lost.

A peek at peak oil

Before 2000, the orthodox view of oil demand was that by 2030 it would grow to around 130mn b/d. By 2000, oil demand was still expected to reach only 120mn b/d by 2030. By 2010, this projection dropped to only 105mn b/d. See the pattern? Oil demand growth has consistently undershot the growth predicted by experts. This year, 2020, will be the first down-year for oil consumption in 17 years, due to the coronavirus outbreak.

Longer term, most oil companies in the world are expecting to see peak demand. Even Saudi Aramco's recent IPO prospectus predicted 'a levelling-off around 2035'. BNEF expects demand from light and heavy vehicles to peak in 2030 – although I see peak road transport demand around 2025; even adding in air transport, shipping and petrochemicals, I believe we will see peak oil this side of 2030.

Society and politics

On the political front too, things are on the move. In the UK, despite juggling the demands of Brexit and the regional rebalancing of the UK's economy, the Boris Johnson government remains committed to achieving net zero by 2050.

At last September's Climate Action Summit in New York, 77 countries announced their intention to follow the UK's lead. The EU's Green Deal will enshrine a 2050 net zero target in law, as well as a plan to reduce greenhouse gases by 'at least 50% and towards 55% by 2030, in a responsible way'.

The political weather has changed, and it is not changing back any time soon.

A final word

So, there you have it – a short tour of the reasons why I believe we will see fossil fuel emissions peak and then decline during the coming decade. It will be a modest decline, perhaps 5% by 2030, not enough to get back on to a 2°C warming pathway, much less the 1.5°C pathway of the Paris Agreement.

Nevertheless, we should be approaching the next decade in a spirit of optimism. Not – as Paul Romer* describes it – the optimism of a child hoping for a great Christmas present, but the optimism of a child getting ready to build a great tree-house. Because only in a spirit of optimism will we rise to the great challenges ahead. ●

*Paul Romer is an economist and policy entrepreneur, and University Professor in Economics at New York University. He was a co-recipient (shared with William Nordhaus) of the 2018 Nobel Prize in Economics Sciences.

This article is loosely based on a piece written for BloombergNEF in December 2019.