ORTHODOX

CONSERVATIVES

The Net Zero Deception

April 2023

Part one: A Reality Check

Every major policy must be subject to a basic reality check prior to any serious discussion of the details at hand. This has become especially important in an age where public perception of a particular issue is so easily distorted by the organs of mass media, mass education and mass entertainment. Positions that are so obviously absurd upon a moment's reflection can quickly become considered not only good but, far more dangerously, sensible in the national consciousness.

This reality check must consist of several components. Firstly, it must be confirmed in principle, assuming the success of the policy, that the means taken to achieve it are justified. In the case of net zero, the required restrictions on personal liberty and the enormous national economic sacrifice must be able to meet this criterion.

Secondly, the cost and chance of failure must be considered. Modern progressive environmental policy tends to suffer from the same fallacy as progressive social policy. That is, it assumes that the progress that has led us to this point is secure, regardless of the preservation of the preconditions of this progress. Of course, this is false. This attitude inevitably leads to an intentional ignorance of the cultural and economic structures upon which our civilization silently relies.

Since these structures require careful and constant maintenance, in the hands of these progressives, they suffer from perpetual erosion and so the possibility for legitimate technological or social progress is lost because the foundation upon which progress can be built, is destroyed.

In the case of net zero, this means that the possibility of failure is simply neglected as there is little thought given to the dependency between environmental progress, toward which the arrow of history is apparently pointing, and the stability of the underlying society which facilitates this.

Thirdly, the cost of inaction must be considered. There must be a kind of null hypothesis against which the risk of action may be compared. In this case, whatever the risk of pursuing a net zero policy, if inaction results in certain global catastrophe, then we simply have no choice.

This report will consider these issues and aim to provide a brief counter narrative which I believe should be considered very seriously by anyone interested in or with influence over environmental policy.

This is, of course, by no means a comprehensive or complete view of environmental policy though it is, in my view, supremely reasonable and almost entirely disregarded and therefore I hope it goes some way to achieving balance in the public conversation.

The remainder of this introductory chapter will place the UK's net zero aspirations in an essential perspective which has become all too obscured.

You may expect that our 2050 net zero goal is at-least feasible given the almost uncritical support it has garnered within our political and media class. This optimism has been justified by the claim that our carbon emissions peaked in the 1972 and have since fallen rapidly, having almost halved since 1990.[1] This claim led Boris Johnson's foreword to our 2021 Net Zero Strategy Report and has been repeated by just about everyone interested in promoting net zero which, as it happens, is just about everyone.[2]

However, upon even a brief closer inspection it becomes clear that this assertion is utter nonsense. If one bothers to read the small print, the inconvenient truth is revealed. Our "world-leading" emissions reductions only appear as such if we neglect the emissions associated with imported goods, aviation, and shipping. This statistical distortion makes little sense if we are to believe that release of greenhouse gasses and the consequent climate change ignores borders and therefore requires a united global solution.

Look a little further, beyond what is mentioned in the government's net zero strategy reports, and you will find that when accounting for imports our emissions actually peaked in 2007, 35 years later than claimed, and far from having halved, have fallen only 11% since a 1990 baseline.[1]

Worse still, our actual emissions reduction largely arises from the economic, not environmental, decision to transition from a coal to natural gas-based energy supply.

This 'Dash for Gas' resulted in a reduction of carbon emissions associated with energy generation of over two thirds.[3] As a consequence, together with the simultaneous offshoring of our major industry, 46% of the UK's carbon footprint can now be attributed to the conveniently disregarded imports.[4]

If the dream of net zero is simply to become a nation entirely reliant on imports, then not only will this fail to achieve the very goal of reducing global carbon emissions but will quite literally make a prisoner of our own nation. If our current energy crisis has taught us anything, it is that you will pay dearly if your national necessities are exposed too heavily to global markets.

If the dream of net zero *is* genuine then we must accept that if our economy has become crippled in large part due to a 11% emissions reduction over the past thirty years, to believe that the remaining 89% can be sustainably eliminated in the next thirty must surely be condemned to the realm of delusion.

What's rarely mentioned though, is that the UK's carbon emissions *have* been shrinking rapidly in one very real way.

At the turn of the twentieth century, the UK accounted for one fifth of global carbon emissions.[5] However, this was not to last. In 1959, having industrialised barely a decade prior, China's carbon emissions sped past ours and by 1998 China had emitted more carbon in their first fifty years of industrialism than the UK has done since the industrial revolution itself. [5]

Still accelerating, since 1998 China alone has emitted the UK's three hundred years of cumulative carbon emissions more than twice over and now emits more carbon that all developed nations combined.[6] With current emissions 35 times greater than our own and increasing, they are expected to lap us again in less than five years' time.[5]

With billions more people across the developing world determined to reap the rewards of industrialism, global energy demand is expected to increase fifty percent by 2050.[7] It may not be too great an overstatement to say that Britain's carbon emissions are an ever-shrinking drop in an ever-growing ocean.

Even if we achieved net zero tomorrow, the result would be the equivalent of offsetting ten days of China's carbon emissions each year.[5] We have no choice but to be deeply sceptical that this reward justifies risking the death of a nation from which the solutions to our global environmental and ecological woes may emerge.

Mortui vivos docent. The dead teach the living – so said to justify the dissection of cadavers to expand knowledge of the causes of death. Unlike the mortuaries of Middle Ages, we have only one body and I fear that the unthinking pursuit of net zero will make a cadaver of our nation and our autopsy will serve as an example for others.

I hope this report will go some way to diagnosing the net zero deception and before it is too late.

Part two: The Green Industrial Revolution: Fact or Fantasy?

Despite the relative insignificance of our already small and diminishing emissions, our aggressive net-zero commitment is justified by appeals to “climate justice” and “global equity”.

As the theory goes, the West, and Britain in particular, is responsible for global industrialisation and is therefore at primary fault for the climate change which disproportionately impacts the developing world, on which it has been imposed through no fault of their own. It supposedly follows that we must be the first to bear the burden of fixing what we begun, namely, by recklessly decarbonising.

The reliance on an argument, clothed in the language of critical theory, which boils down like much of the progressive worldview to a fantasy of revenge against progenitors of civilisation, seems especially strange for a movement that markets itself as led by the cold and indisputable scientific truth.

This argument, in its emotional and ideological motivation, rarely considers the plain practicality of the policy it promotes. If any political issue calls for pragmatism, it is this.

This chapter will aim to provide a brief analysis of the viability of utilising existing technology for national decarbonisation. In particular, the technology on which much of the UK’s net zero hopes are pinned, the heat pump.

Later chapters will deal with the dangers of decarbonisation more generally however here a specific example will be used to demonstrate the absurdity of the claim that net zero policy and the economic boom of the ‘green industrial revolution’ can co-exist.

Heat pumps are perhaps the simplest example demonstrative of the general complexity, cost, and unattainability of rapid decarbonisation. The heating of buildings currently accounts for 15% of the UK’s energy usage and over 20% of carbon emissions and therefore has naturally been a key priority of our decarbonisation policy.[8] [9]

Unlike much of the technology which has been identified as crucial in the net-zero transition, heat pumps already exist in a viable form. They are, after-all, fairly simple, utilising a refrigerant to transfer thermal energy from the air outside to the air inside a building. Effectively a conventional refrigerator in reverse.

Their green potential is also quite real. They are theoretically extremely efficient, around three times more efficient than gas boilers in laboratory tests, and operate directly from the electrical grid, bypassing the need for direct use of fossil fuels.[10]

In practise though, their green credentials are rather more questionable. As usual, as we exit the realm of theory, our aspirations must become significantly moderated. Several analyses of retrofitted heat pumps in the UK have revealed that heat pumps confer emissions savings of only 12% with barely a 50% increase in efficiency when compared to equivalent gas boilers, at a much greater costs to the consumer.[11] [12]

A transition away from gas boilers and towards heat pumps forms by far the least complex and most feasible portion of our net zero policy. If it proved to be unfeasible then the whole project has fallen at the first and the lowest hurdle.

The scale of the government's ambition is immense. Despite the UK having installed only a quarter of a million heat pumps to date, the Committee for Climate Change has dictated that by 2035 we must have reached close to two million new installs per year.[13]

The government's strategy is twofold. Firstly, phase out the installation of new gas boilers and secondly, provide generous grants for the retrofitting of heat pumps to bring the cost to consumers closer to parity with gas boilers. Under current plans, by 2025 gas boilers will be banned from newly built houses and by 2035 their installation will be banned all-together.

As part of the £450 million Boiler Upgrade Scheme, grants of £5000 are available to subsidise the cost of retrofitting new heat pumps in existing homes. Not only does this fail to achieve the stated goal of cost parity but it also provides no answer to the significantly greater running costs of retrofitted heat pumps.[11]

The small issue is – this alone will contribute, at most, to the installation of 90,000 heat pumps over three years. The rate of this funding corresponds to the subsidisation of only 3% of the one million per year by 2030 target, which would leave the remaining 97% to be paid in full by homeowners at a cost of over ten times that of a gas boiler.

As for the £450 million budget. To achieve the installation of the estimated 19 million heat pumps that, according to the CCC, would be required to reach our net zero targets would cost the government upwards of £95 billion in grants. Current funding, therefore, leaves us not even 0.5% of the way there.

The calculations presented here are broadly consistent with the concerns raised by the Environmental Audit Committee - that the cost of retrofitting would exceed current forecasts by as much as £65 billion.[14]

What's more, the Boiler Upgrade Scheme fails to cover new builds. With developers remaining hesitant to spend a hefty premium for heat pumps, the government has almost comically recommended that homeowners rip out their brand-new boilers the moment they move in and immediately apply for a heat pump grant.

There are challenges and impossibilities all the way down the supply chain. Today, the vast majority of our heat pumps are imported.[15] The government has the stated aim of increasing the number of heat pumps manufactured and sold in the UK by thirty times by 2030 along with a reduction in consumer price of 25- 50% by only 2025 and parity with gas boilers by 2030.[16]

We are currently so far from on target to reach this goal that it has already been consigned the growing pile of forgotten promises. Industry leaders Worcester Bosch and the trade association Energy and Utilities Alliance have countered government claims and confirmed that there is little prospect of any significant reduction in heat pump prices in the near future.[17] [18] No wonder our targets are failing in view of the fact that we have barely 10% of a required 27,000 trained heat pump engineers in the UK.[19]

The refrigerants on which the functioning of the heat pump is based pose another significant obstacle. Almost all heat pumps utilise hydrofluorocarbons (HFCs) for this purpose. Hydrofluorocarbons became widely used as a replacement for the strongly ozone depleting chlorofluorocarbons in the 1990s. Although not as damaging to stratospheric ozone, they are amongst the most potent greenhouse gases known, with a Global Warming Potential (GWP) of up to 20,000 times that of carbon dioxide.[20]

The inevitable nature of refrigerant leakage has led to significant concerns from environmental groups, regarding the long-term roll-out of high GWP HFC containing heat-pumps. In fact, studies assessing domestic heat pumps in the UK and Ireland have concluded that, in large part due to leakage, they have a larger carbon footprint than conventional gas boilers and typically miss manufacturer efficiency claims by around 40%.[21] [22]

In 2019, the Kigali amendment to the Montreal protocol came into effect, ratified by 145 states, including the UK. According to the amendment, we must commit to an 85% reduction in HFC use by 2036.[23]

Despite this, the technology to utilise alternative refrigerants is severely lacking, in large part due to the high pressures necessary to utilise low GWP refrigerants effectively. While some novel technologies, specifically specialist compressors, have been developed, they have so far been unable to demonstrate commercial viability.

The contradiction here is demonstrative of the wider incongruity of the net zero strategy that at once demands accelerated green technological progress while restricting the materials necessary to bring about this change.

A national transition to heat pumps alone would clearly require an economic sacrifice orders of magnitude greater than that we are currently making. If national infrastructure projects of recent decades provide any indication, the estimates in this report will prove to be vastly understated and the true cost of a heat pump transition will rise well into the hundreds of billions – above the annual funding received by the NHS.

The catastrophe that would result would not only strike a mortal blow to our already crippled economy but would restrict our potential for any meaningful future investment in environmental stewardship. If this is the scale of difficulty that we face in achieving our most basic of net-zero commitments, we can hardly hold out hope for the rest.

Part three: The Danger of Green Growth

"The next decades will see the greatest industrial transformation of our times, maybe of any time." These were the words of Ursula von der Leyen, President of the European Commission, speaking just weeks ago at the WEF in Davos.

If this language sounds strange, there is good reason. The most obvious being the dissonance between the belief that a period of unprecedented economic acceleration is upon us and our experience of life in, at best, a stagnating and, at worst, a collapsing economy.

If there is any reason that we are vulnerable to this utopian rhetoric it is that we have become so numb to decline that many of us no longer notice the dilapidation of our most essential infrastructure and public services. We have come to expect our inability to build anything new so this ambition, albeit at odds with reality, is alluring.

To put this into perspective. The 'legally binding' date by which net zero must be achieved, 2050, is only five years later than the target date for the construction of phase 3 of HS2. That HS2 is already running three times over budget with endless delays and is now at risk of being almost all together scrapped, should give us pause in believing that we are capable of developing novel emission free technologies and using them to replace the entirety of our energy, industrial, domestic and transport infrastructure. All just in time for the completion of a modest railway line – those things that covered our country over a century ago!

While the last chapter of this report dealt with the difficulty of implementing existing low-carbon technology on a large scale, the real challenge of net zero lies in the rapid development of new technology within a healthy economy and the simultaneous elimination of the emissions on which this economy currently relies.

Belief in this success, in essence, is the theory of 'green growth'. This chapter should provide a brief and critical overview of this concept.

The core claim of the UK's instantiation of net zero policy is that green growth is not only possible but is the only sensible course of action in the face of the 'climate crisis'.

This model of green growth is far from new and finds its roots well into the twentieth century however it was most famously and impactfully articulated in the 'Stern Review' of 2007.[24] Through analysis of climate economic models, it concluded quite simply that the costs of reducing emissions are far outweighed by the costs incurred due to climate change by not doing so. This sentiment is repeated in the most recent Net Zero Strategy Report which is prefaced with the justification for radical policy that "the costs of inaction on climate are far greater".[2]

Issues arise when you consider that the Stern Review was rapidly discredited from almost every direction.[25] [26] [27]The already wildly unreliable climate forecasts on which it was based were misused and improperly extrapolated. Stern's estimates for the costs of climate change consistently cherry picked the most pessimistic forecasts and as a result the review stands as a complete outlier in the climate economics literature.

While the dangers of climate change were exaggerated, Stern almost entirely disregarded the benefits afforded by the facilitation of more rapid development of sustainable low carbon technology in a growing economy.

The absurdity of this and similar reports is confounded by the synthesis of two complex and inherently unpredictable systems, the economic and climate systems, which have uncountable interactions both within and between them. Attempting to draw reliable long-term forecasts from these data, despite the unreliability of even short-term forecasts in either, is a fool's errand.

Cutting past the vague utopian waffling, what 'green growth' therefore really refers to is the decoupling of GDP from resource use and greenhouse gas emissions. This, too, is far from a novel idea and has in fact been the focus of intense academic interest for over two decades.

Since Stern, there has been an especially concerted effort on the part of the world's economists, social ecologists, climate scientists and anthropologists to demonstrate that this decoupling is possible. Despite this, there has been almost no evidence that rapid 'green growth' is possible without self-defeating economic damage. Recent metanalysis of these rapid so-called green growth scenarios, carried out by academics at leading renewable-resource research university in Vienna, has reached the same conclusion.[28]

In plain terms, it has been consistently demonstrated that the costs involved with decarbonisation, the reduction of resource use, and the consequent economic disruption rules out a scenario of simultaneous economic stability and rapid decarbonisation. This is precisely the reason that the academic discourse has so strongly shifted away from green growth and towards degrowth in recent years. Politicians have now been left behind by the very science which they so faithfully followed.

Proponents of green growth are quick to point out the successes of previous industrial revolutions – whether it is the use of mechanised manufacturing and steam power in the first or the wide adoption of telegraphs and railways in the second.

However, this is a dangerous and deliberate false equivalence. While the state no doubt played an important role in these periods of technological progress – our current proposals are marked by an intentional inversion of the natural process of change.

While technology is ordinarily allowed to develop from a conceptual embryonic stage to full fruition with dependant infrastructure only constructed as the technology grows more stable and proves its viability ever more, our current policy could not be clearer – state mandated infrastructure now comes *before* technology.

This means that a radical path to net-zero aims to pre-emptively construct path dependencies before the technology in question has ever demonstrated viability or even the potential for such. Of course, this approach is questioned little due to the ever-pervasive myths of progress that so firmly inhabit the collective consciousness of the age. These myths are false. The success of these technologies is not inevitable and even a long history of punctuated technological development does not prove this.

We must not understate that Net Zero represents the most significant centrally planned economic project that has ever taken place outside the communist world. Hayek's criticism remains as prescient as ever here. We must harken to his wisdom.

"If man is not to do more harm than good in his efforts to improve the social order, he will have to learn that in this, as in all other fields where essential

complexity of an organized kind prevails, he cannot acquire the full knowledge which would make mastery of the events possible".

The point here could hardly be more relevant to our current predicament. This becomes quite plain if we assert the counter narrative that the net zero agenda is in fact a regime that aims to possess complete control over every aspect of the most consumptive and interconnected economy in human history in order to eliminate emissions by using technologies that do not yet exist.

It is now more true than ever that it is simply not possible for a central power to synthesise the necessary information to maintain effective control over economic and social progress because the economic and cultural systems that regulate this progress are far too complex and quickly evolving to facilitate the collection and computation of the necessary data.

At any time in history, if even the brightest minds were asked to construct a singular vision of the technological state of the future, it is quite clear that in almost every case this vision would fail. Today we are ruled by far from the brightest minds.

In fact, we unknowingly live in a graveyard of failed technologies, experiencing only a tiny subset of technologies that have proved successful. For example, in the early 19th century, atmospheric railways were regarded by many as a natural progression from horse or human powered rail. In the following decades atmospheric railways were trialled across Britain and France and eventually found to be riddled with unforeseen technical limitations and therefore gave way to the steam locomotive.

The atmospheric railway was *allowed* to fail and for this we should be thankful. If it were instead the case that it garnered reckless state investment that assumed its eventual success, then its failure would have stunted the wider economy and the development of rail travel in general. The same story applies to almost all technology that makes up modern civilization.

Even our successes followed the same model. Generations passed between the development of functioning and viable telegraphs and the committed investment in the infrastructure necessary to support their proliferation across nations.

It is only today that the leaders of the West are intent on bucking this trend. Worse still, until recently, the impact of such a mistake would have been restrained by the lack of global interdependence and interconnectedness. Today, however, green growth is gambling the first and only truly global civilization. There are no redundancies. There are no second chances. If this fails, we risk a civilizational decline from which it may not be possible to recover.

Part four: Is Green Transition Sustainable?

The road to net zero consists of two principal components – renewable energy and electrification. Although simple to state, there is a complex matrix of technology, infrastructure, cultural change, and legislation which must mature together in a stable political and economic environment if there is any reasonable expectation of success.

This final component of economic stability, mentioned too rarely in discussions surrounding net zero, must be held an absolute pre-condition to any serious environmental policy.

If the second order consequences of decarbonisation policy within the wider political and economic realms are intentionally neglected within so called net-zero 'forecasts', then they have assumed their own success and are rendered useless.

This neglect forms part of a larger pattern of an astounding and worrying dissonance in the language of our political leaders who, in one breath, exhort the 'green industrial revolution' as belonging to the most significant and disruptive revolutions in history and, in their next breath, comfort us with forecasts that assure us of a perfectly orderly transition.

Here there is a certain use in listening to the worst agents of globalism owing to the fact that, unlike politicians, they don't derive their power from public support and therefore can speak far more honestly about the impacts of net-zero policy.

Such a man, Peter Giger, Zurich Group's Chief Risk Officer and a contributor to the WEF's Davos Agenda, warned in 2022 that "a disorderly transition will have far-reaching economic and social implications. The current energy price spikes are just the tip of the iceberg in terms of the impact of the net-zero transition."

However, the effects of a disorderly transition reach also far beyond the political and economic. There is plentiful evidence that many aspects of environmental degradation peak at 'intermediate' levels of economic development, which the UK has now long passed.[29] [30] [31] This pattern can be observed in many variables including per capita carbon emissions, environmental pollutants, and deforestation.

The long-term environmental danger here is potentially disastrous. If 'unforeseen' impacts of the net-zero transition continue to prevent ordinary people from heating their homes or feeding their families, then the governments that persist in this national sacrifice will be promptly and rightly removed.

As a consequence, it is not unlikely that our national energy and industrial systems would, in order to save our nation from perpetually worsening economic catastrophe, regress decades to resemble the period in which the greatest volumes of domestic greenhouse gasses were emitted. In such a scenario, we would look upon our current predicament and think ourselves mad for failing to prioritise the orderliness and economic sustainability of a low-carbon national transition.

The Global Financial Crisis has already demonstrated that in times of economic crisis, environmental and ecological protection rapidly falls down the list of political priorities. Across both the developing and developed world, environmental regulation went unenforced and funding for many conservation programmes dried up.

The evidence for the negative environmental impact of financial crises in general is overwhelming. A 2020 study from the University of Sussex analysed over 400 financial crises around the world and found that falls in carbon emissions associated with economic recession are quickly reversed as economies urgently rebuild with far less care for environmental health.[32] This reveals a vital truth. A decarbonising economy that exists in state of punctuated crisis damages the environment far more than a stable economy that is trending in the same direction.

This same pattern emerges when we examine the countries hardest hit by the eurozone crisis. Coastal and marine pollution in Greece rapidly worsened and the reduction of investment in renewable energy in Spain led to an increase in greenhouse gas emissions associated with the energy sector.

This process has already begun in the UK, owing to the energy price disaster. According to YouGov, the portion of our population who consider the environment 'one of the most important issues facing the country' has slipped over a third to only 22%. During the same period, the economy has become the primary political concern of the British public with threefold the number of people naming it within their top three concerns compared to the environment.

This provides fair motivation to disbelieve the conventional wisdom that either economic ‘degrowth’ or a crisis ridden ‘transition’ benefit a nation’s environment and ecology. We need not look far for examples. The trend of ‘backwards’ gas to coal switching due to the gas crisis, particularly across Europe and the US, heavily contributed to the six percent increase in global carbon emissions in 2021.[33] We too are far from immune from this trend, this year emergency reserve coal fired electricity required for the first time.

Decarbonisation of the power sector has so-far proved to have the most impact on national emissions. The transition from a coal to gas-based energy supply is largely responsible for the 76% reduction in carbon emissions associated with power stations from 1990 to 2021.[16] Today, only 11% of the UK’s terrestrial carbon emissions arise from electricity generation.[16]

Unqualified, this appears to provide an optimistic outlook for the future of decarbonisation in the energy sector, however, as is often the case, net zero policy aims to reverse the conditions that facilitated steady emissions reduction in the first place.

While electricity demand in the UK has been falling for decades, it is projected to at-least double by 2050 due to a concerted policy of infrastructure electrification.[34]

Despite this rocketing demand, the carbon intensity of electricity generation must fall by 93% by 2035 in order to comply with the commitments of the sixth carbon budget.[34]

The most recent plans, as indicated in the 2022 Energy Security Strategy, present a vision of an energy system dominated by wind and solar. Offshore wind capacity is touted to increase five-fold to 55GW by 2030 and likewise a five-fold increase of solar capacity to 70 GW is expected by 2035.[35]

It is worth noting that despite the promises of all governments since Blair, it has been dictated that the proven and clean technology of nuclear power will play a minor role, providing only 24 GW by 2050.[16]

It is true that low carbon sources (including nuclear) currently account for almost half of the UK's electricity generation however this still indicates that a four-fold increase in low carbon generation is required in the coming decades, before accounting for the inherent intermittency problem of renewable energy.

While renewables are fairly technologically mature, the technology required to solve intermittency is not and therefore it presents the most significant barrier to an net zero grid. Put simply, we cannot control when the sun is shining, or the wind is blowing and therefore the adoption of renewables is bound together with the inability to control the timing of our electricity generation.

The maintenance of stability in the UK's power system already accounts for approximately 10% of the overall cost of generation. The complexity of this maintenance will increase exponentially as more variable renewables are introduced, grid decentralisation increases, and the daily and seasonal demand variation grows due to domestic and industrial electrification.

If we remain committed to the abandonment of fossil fuels before there is a viable solution to intermittency, we are effectively carrying out open surgery on our nation before we have acquired antiseptics.

Both of the primary solutions to intermittency have, at best, in their current iterations, failed to demonstrate capability to support a low carbon grid. There are two approaches which must be rapidly integrated to solve the problems presented by a grid powered by variable renewables – storage and fossil fuel backup with integrated carbon capture.

The net zero agenda has likewise recognised that carbon capture may be the only solution to inconvenient 'residual emissions' that will remain in the energy and industrial sectors following the execution our net zero plans.

According to the 'Balanced Pathway' to net zero, by 2035, 30 TWh of generation will come from gas CCS, five times the capacity of our entire nuclear fleet. In an effort to secure investments for domestic carbon capture projects, the Department for International Trade has called carbon capture a "necessity in delivering the UK's target of achieving net zero emissions by 2050 and to supporting a greener economy."

CCUS is intended to be deployed in within four of the proposed 'industrial clusters', located in some of Britain's most deprived regions including the North East and South Wales, by 2030.

One may assume that carbon capture technology is in its infancy and will shortly enjoy that phase of rapid development associated with massive investment in primitive technologies. On the contrary, carbon capture for use in enhanced oil recovery has existed since the early 1970s and has been researched for its potential in sequestration since the 1980s. It is, by all accounts, a fairly mature technology.

Despite this, there is not a single successful example of carbon capture integration in the power sector despite global investment reaching the hundreds of billions. The most pioneering of their kind, the multi-billion US Petra Nova and Kemper plants have collapsed after falling well short of their carbon capture targets and plaguing the fossil fuel power stations to which they are attached with constant shutdowns.[36]

After having sold its 50% stake in Petra Nova for only 3.6 million dollars, NRG Energy lost over 99% of their investment. This has served as a warning to the private sector against betting on carbon capture technology, increasing the investment burden and exposure of the state on an already risky technology.

Yet, the government has still insisted to bet on the success of carbon capture. Not only will billions in public money support the development of gas CCS but the biomass plant at Drax Power Station in Yorkshire is also in plans for conversion into a Bioenergy with Carbon Capture and Storage (BECCS) plant.

This will form the first major project of its kind in the world. The subsidy provided to Drax through this period is expected to reach around £500 per person in the UK.[37] Despite everything indicating inevitable failure, the single-minded zeal for net zero has staked our energy system on the unlikely success of carbon capture.

Part five: The Death of Net Zero

In previous chapters, the viability of specific technologies necessary for the achievement of net zero has been discussed and found to be lacking. In this final chapter, two major structural barriers to net zero will be presented.

Today, additions of intermittent renewable generation to the grid must be accompanied by relatively small additions to energy storage capacity. While this may appear manageable, there is strong evidence to suggest that we have approached an impasse in the road to further penetration of renewables in the grid.

According to well corroborated recent findings, as we pass a critical value of 40-50% penetration of variable renewables, the rate at which new storage is required will increase by close to thirty-fold.[38] This should be especially concerning as our grid is now close approaching this apparent barrier which, if is impossible to pass, may leave us living with South African style rolling blackouts.

This provides yet another rebuttal to the belief that the road to net-zero is one of linear and steady progress for which a trend of decarbonisation is bound to continue. Instead, the evidence suggests that there are long periods of 'easy' decarbonisation punctuated by technological and economic barriers for which a solution is far from inevitable.

Projections suggest that to avoid this fate, our long-term storage must grow by, at minimum, eight times current capacity by 2035.[39] As we pass 2035 and 80% variable renewables penetration, further increases must be accompanied by a one-to-one increase in storage capacity.

In the unlikely event that it is feasible to develop and integrate the necessary battery, long-term storage, flexible gas with CCS, and interconnection to facilitate a high renewables penetration, the costs would be too immense anyway.

Although reports commissioned by the CCC indicate that the marginal costs of integrating variable renewables when penetration passes 50% cluster around approximately £20 per MWh, more recent studies analysing the real word effects of renewables integration have reached vastly different conclusions.[40]

A 2019 analysis of the energy system in France revealed that, when fully accounting for the additional storage costs and the crowding out of investment in other generation technologies including nuclear, the cost of the negative externalities of variable renewables may be greater than €100 per MWh - which alone is approximately equivalent to the current price of electricity.[41]

The other side of the coin may prove to be just as troublesome and expensive. Not only do renewables often produce insufficient electricity, they also often produce excess. If the aforementioned measures fail to effectively facilitate sufficient storage infrastructure, then the cost of 'constraint payments' – compensation given to wind and solar farms for excess generation – will increase and contribute to further increasing electricity price to unsustainable levels.

However, at the heart of net zero lies another deception. Much of the early motivation driving a transition away from fossil fuels was premised on a panicked notions of fossil fuel reserve depletion, most notably manifested in the false notions of an imminent 'peak oil'.

Masquerading behind an important concern for energy security, a coalition quickly of academics, environmental advocacy groups, politicians and the courts quickly emerged with the single objective of demanding immediate transition to renewable energy without consideration for the practicality or prudence of this transition. Naturally, the only known reliable, clean, and secure renewable energy, nuclear, was opposed with even greater vigour than fossil fuels. This should expose quite clearly the true motivations of the so-called green lobby.

In retrospect, their success was inevitable against a political adversary, in the conservative party, with an unofficial policy of taking the path of least resistance on every difficult issue.

Today, their success has created a problem very much like that they claimed to solve. This time, however, it may just be real.

The reliance of low carbon technology on various rare critical minerals may render a decarbonised economy materially unsustainable and bound for failure.

Critical minerals present an even more complex supply problem than fossil fuels. Unlike fossil fuels, most critical minerals have a highly concentrated global reserve distribution, often limited to just a few countries.

Despite efforts of Western economies to increase domestic production of critical minerals, China still accounts for over 60% of the global supply.[42]

This presents a danger to Western nations which may prove to be existential. There is simply no possibility for most of the West, including Britain, to approach self-sufficiency in critical mineral supply, even when taking into account rapid improvements in recycling technology and infrastructure.

We are quite voluntarily handing our greatest geopolitical enemies an off switch to our entire nation, and arguably civilisation, while they make material self-sufficiency their primary economic goal. Unlike food and fossil fuels, despite current reliance on imports, we do not even possess the threat of self-sufficiency in critical minerals.

It is not only economic dependency that poses a threat but intense global competition. It is typical for a single country to supply around half of the global flow for a particular mineral. It may be unsurprising that China is also winning on this front, controlling the greatest share of the mines of critical minerals across the developing world and dominating the global refining and processing of those minerals for which it does not possess a large domestic supply. Currently nearly 90% of refining of rare earth elements is controlled by China.[39]

Seventy percent of the world's cobalt comes from the Democratic Republic of the Congo and over two thirds of the refining takes place in China.[43] [44] And with global demand estimated to jump 585 percent by 2050, experts have now recognised that a serious global shortage is inevitable before the end of the decade, even under the assumption that cobalt-free battery technology is developed at the fastest possible rates.[45]

This demand is and will continue to be met through the extensive use of child slavery in the DRC where the poor are forced to labour in deadly conditions down the barrel of a gun.[46]

While this brand of environmentalism has been incorporated into the smug progressive religion that dominates our culture, it ultimately relies on wellconcealed horrors of historical proportion that surpass even the worst aspects of the system it aims to supplant.

The other principal critical mineral essential for battery technology and therefore grid stability and EVs, lithium, also suffers from major barriers to a sustainable, long-term supply. The story here remains much the same. Annual demand of lithium is expected to peak at as much as 140 times current extraction volumes and over two times future resource forecasts.[47] Again, a global, let alone national, shortage in the medium term appears inevitable if we continue along the same path.

Putting aside the ecological and environmental devastation wreaked by extraction of critical minerals, they form yet another constraint on net-zero and yet another unsustainable technology and resource on which a net zero economy relies and will continue to rely.

In isolation, many of the problems presented in this report appear solvable, albeit with great investment and risk. Unfortunately, it is not sufficient that only some of the proposed technologies or economic reforms prove to be viable because their place in the net zero order relies explicitly on the success of one another.

A net zero Britain will be a house of cards perpetually on the precipice of collapse and every card will shiver at the slightest breeze. In an age of growing global economic competition, resource scarcity, and geopolitical conflict, national economic stability, resilience, and self-sufficiency have never been more important. Yet, our leaders are dragging us in precisely the opposite direction. Our economy will become fragile, we will be helpless in the face of our increased dependency on Chinese resources, and any major perturbation in the global landscape will threaten the safety and prosperity of our nation. Nor is any service done to the environment by impoverishing the very nation which may hold the key to a truly green and hopeful future. Therefore, it is a duty to our nation, and especially its environment, to stand opposed to this false and dangerous vision of a net zero future.

References

[1] Syed, A. (2019). The decoupling of economic growth from carbon emissions: UK evidence. *Office of National Statistics*

[2] Net Zero Strategy: Build Back Greener. *HM Government, London*.

[3] BEIS (2022). Final UK greenhouse gas emissions national statistics: 1990 to 2020.

[4] WWF (2020). Carbon Footprint: Exploring the UK's contribution to climate change.

[5] Friedlingstein, P. et al. (2022). Global Carbon Budget 2022, Earth Systems Science Data, 14.

[6] Larsen, K. et al. (2021). China's greenhouse gas emissions exceeded the developed world for the first time in 2019. *Rhodium Group*.

[7] U.S. Energy Information Administration (2021). International Energy Outlook 2021.

[8] Committee on Climate Change. (2021). Progress in reducing emissions: 2021 report to Parliament.

[9] Department for Business, Energy & Industrial Strategy (2018) Clean Growth - Transforming Heating: Overview of Current Evidence, 2018.

[10] Wang, R. Z., Jin, Z. Q., Zhai, X. Q., Jin, C. C., Luo, W. L., & Eikevik, T. M. (2018). Investigation of annual energy performance of a VWV air source heat pump system. International Journal of Refrigeration, 85.

[11] Le, K. X., Huang, M. J., Shah, N. N., Wilson, C., Mac Artain, P., Byrne, R., & Hewitt, N. J. (2019). Techno-economic assessment of cascade air-to-water heat pump retrofitted into residential buildings using experimentally validated simulations. Applied Energy, 250.

[12] Kelly, N. J., & Cockroft, J. (2011). Analysis of retrofit air source heat pump performance: Results from detailed simulations and comparison to field trial data. Energy and Buildings, 43.

[13] Department for Energy Security and Net Zero (2023). Heat Pump Investment Roadmap.

[14] House of Commons Environmental Audit Committee (2021). Energy Efficiency of Existing Homes.

[15] BEIS (2020). Heat Pump Manufacturing Supply Chain Research Project Report.

[16] Committee on Climate Change. (2022). Progress in reducing emissions: 2022 report to Parliament.

[17] EUA (2021). Government's Clean Homes Grant derided as 'insufficient for the scale of the challenge'.

[18] EUA (2022). UK heating industry tells Business Secretary it's "time to get serious" with net zero homes.

[19] Nesta (2022). How to Scale a Highly Skilled Heat Pump Industry

[20] Jain, A. K., Briegleb, B. P., Minschwaner, K., & Wuebbles, D. J. (2000). Radiative forcings and global warming potentials of 39 greenhouse gases. Journal of Geophysical Research: Atmospheres, 105.

[21] Johnson, E. P. (2011). Air-source heat pump carbon footprints: HFC impacts and comparison to other heat sources. Energy Policy, 39.

[22] O'Hegarty, R., Kinnane, O., Lennon, D., & Colclough, S. (2022). Air-to-water heat pumps: Review and analysis of the performance gap between in-use and product rated performance. Renewable and Sustainable Energy Reviews, 155.

[23] UN (2016). Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer.

[24] Stern, N. (2006). Stern Review: The economics of climate change.

[25] Saltelli, A., & D'Hombres, B. (2010). Sensitivity analysis didn't help. A practitioner's critique of the Stern review. Global Environmental Change, 20.

[26] Nordhaus, W. D. (2007). A review of the Stern review on the economics of climate change. Journal of economic literature, 45.

[27] Weyant, J. P. (2008). A critique of the Stern Review's mitigation cost analyses and integrated assessment. Review of Environmental Economics and Policy.

[28] Haberl, H et al. (2020). A systematic review of the evidence on decoupling of GDP, resource use and GHG emissions, part II: synthesizing the insights. Environmental research letters, 15.

[29] Churchill, S. A., Inekwe, J., Ivanovski, K., & Smyth, R. (2018). The environmental Kuznets curve in the OECD: 1870–2014. Energy economics, 75.

[30] Sarkodie, S. A., & Ozturk, I. (2020). Investigating the environmental Kuznets curve hypothesis in Kenya: a multivariate analysis. Renewable and Sustainable Energy Reviews, 117.

[31] Apergis, N., & Ozturk, I. (2015). Testing environmental Kuznets curve hypothesis in Asian countries. Ecological indicators, 52.

[32] Pacca, L., Antonarakis, A., Schröder, P., & Antoniades, A. (2020). The effect of financial crises on air pollutant emissions: An assessment of the short vs. medium-term effects. Science of the Total Environment, 698.

[33] IEA (2022). Global Energy Review: CO2 Emissions in 2021.

[34] Committee on Climate Change (2020). The Sixth Carbon Budget - The UK's path to Net Zero.

[35] BEIS (2022). British energy security strategy.

[36] Institute for Energy Economics & Financial Analysis (2022). The carbon capture crux: Lessons learned.

[37] Ember (2021). Understanding The Cost of The Drax BECCS Plant to UK Consumers.

[38] Zsiborács, H., Baranyai, N. H., Vincze, A., Zentkó, L., Birkner, Z., Máté, K., & Pintér, G. (2019). Intermittent renewable energy sources: The role of energy storage in the european power system of 2040. Electronics, 8.

[39] Aurora Energy Research (2023). Long Duration Electricity Storage in GB.

[40] Imperial College [for the CCC] (2015) Value of flexibility in a decarbonised grid and system externalities of low-carbon generation technologies.

[41] Dowling, J. A., Rinaldi, K. Z., Ruggles, T. H., Davis, S. J., Yuan, M., Tong, F. & Caldeira, K. (2020). Role of long-duration energy storage in variable renewable electricity systems. Joule, 4.

[42] IEA (2022). The Role of Critical Minerals in Clean Energy Transitions.

[43] U.S. Geological Survey. Mineral Commodity Summaries 2020.

[44] Dehaine, Q., Tijsseling, L. T., Glass, H. J., Törmänen, T., & Butcher, A. R. (2021). Geometallurgy of cobalt ores: A review. Minerals Engineering, 160.

[45] Zeng, A., Chen, W., Rasmussen, K. D., Zhu, X., Lundhaug, M., Müller, D. B., ... & Liu, G. (2022). Battery technology and recycling alone will not save the electric mobility transition from future cobalt shortages. Nature communications, 13.

[46] K, Siddharth (2023). Cobalt Red: How the Blood of the Congo Powers Our Lives.

[47] Junne, T., Wulff, N., Breyer, C., & Naegler, T. (2020). Critical materials in global low-carbon energy scenarios: The case for neodymium, dysprosium, lithium, and cobalt. Energy, 211.