



Refocusing Climate Change

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Part 1

The Scientific Background

“I would rather have questions that cannot be answered than answers that cannot be questioned”

Richard Feynman

**“When all think alike,
then no one is thinking”**

Walter Lippmann



Refocusing Climate Change

1.1 Preface

My views have changed from an instinct to trust IPCC to a position which seeks to question the way science has been presented.

Before diving into this debate, there is much good advice to be had by reading David Mackay's on-line book "[Sustainable Energy without the Hot Air](#)". It helps grasp the scale and is agnostic about the reasons why we should reduce our dependence on fossil fuel.

1.2 Two Key Presentations

I think I can narrow down the best guides to my understanding with two key presenters. The first is **Steven Koonin**, who has had a distinguished scientific career. He has written a book titled "Unsettled?" which examines what science actually says, and the limits of accuracy of the results. In particular, he questions the validity and value of computer model predictions of future climate. He has presented his book at numerous events, and this is quite a good one, with a useful discussion afterwards

Koonin [Presentation](#)

I like his approach because he tries to address issues by examining the IPCC Assessment Reports, or on occasion the underlying scientific papers. So, he is accepting, mostly, the work of the front line scientists while challenging the interpretation and presentation of that work by the IPCC process and the media. Furthermore, he then goes on to offer ways forward from where we are now.

The second author is one I found by accident. **Tom Gallagher** does not have a public scientific profile, but his experience seems to be appropriate. I was surprised by the meticulous way he develops his arguments, and the wide range of scientific disciplines he covers in order to justify his conclusions. Broadly they complement the views of Steven Koonin. I persuaded a good scientific friend of mine, well known in the field of marine science and modelling to comment on the presentations, and he broadly gave them a positive review - apart from a couple of question marks. Tom Gallagher's ideas are set out in 3 video lectures, namely

[Paleoclimatology Part 1](#)

[Paleoclimatology Part 2](#)

[Paleoclimatology Part 3](#)

They will reward well the time taken to watch them.

1.3 Net Zero by 2050?

Having had a history of looking at environmental matters in ports and shipping, I was led into trying to evaluate whether the shipping industry could and/or would achieve the 2050 net zero target set by the UN after the report of Working Group 1 in August 2021. (The results of my study can be viewed on [my website](#).)

Briefly, the technologies required to achieve a zero carbon ship may exist, but not yet on an industrial scale, or using processes that are 'green'. Different shipping

sectors will require different solutions, and developing countries would need time and support to make progress, To take only deep sea shipping as an example, the most probable solution will be to convert the ships to use a derivative of hydrogen, probably ammonia, provided it can be produced using a low carbon process. Even this would be difficult to achieve in the proposed timescale considering the need to

- Convert ships machinery to use ammonia and increase bunker capacity to maintain range (ammonia has a lower energy density than hydrocarbon fuels)
- Create the fuel manufacturing and distribution capacity

(The use of a hydrogen derivative is necessary because pure hydrogen is difficult to store and potentially hazardous)

Even the ports would face a massive demand for extra power to provide electric power for short range ferries and harbour craft, and shore power to cargo and passenger ships while in the port. Ports would be competing with the electricity requirements for electric cars and heat pumps for houses too.

On the broader issue of decarbonising the land-based electricity grid, there is considerable evidence that the problems of coping with the intermittent nature of current renewables (solar and wind) may turn out to be much larger than assumed until now, and may possibly be insoluble and/or unaffordable. An interesting study by Francis Menton titled [“The Energy Storage Conundrum”](#) explores this issue in some depth. The study is clear and well quantified. However, it makes no reference to tidal power, which is wholly predictable, and fails to consider the use of hydrogen derivatives to ease the many issues associated with using pure hydrogen. Neither of these issues would change the broad conclusion that the absence of practical storage technologies makes the achievement of Net Zero by 2050 totally impractical. Indeed it may not be possible at all without a major paradigm shift in the technologies applied.

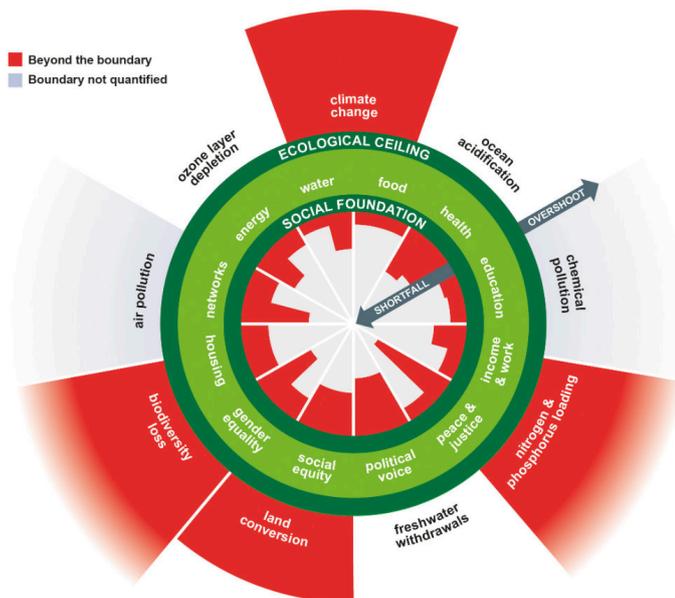
I have come to the conclusion, which I share with Steven Koonin (and Michael Kelly of GWPF), that there is very little chance that Net Zero can be achieved by 2050, even if the political will was there to do so (COP 27 has probably demonstrated that such political will is at best patchy). Like him, I believe that the best (possibly the only realistic) response is through **adaptation** to climate events as they become inevitable and current.

1.4 Economic Goals

During my investigations, my attention was drawn to a developing thread in the field of economics. The suggestion is that we are already living beyond the resources of the planet, so continuous growth may not be possible. This idea is at odds with the way we measure economic success by (exponential) growth in GDP. The ideas are well developed in a book by *Kate Raworth* titled [“Doughnut Economics”](#).

At its simplest, Kate Raworth posed a system where there are 9 ecological attributes. The red wedges outside the diagram represent areas where human use of earth resources has (it is alleged) exceeded the capacity of earth to self-regulate (The ecological ceiling). There are also about a dozen social factors. Our aim should be to provide a minimum standard for each of these for the entire world population. The red wedges inside the orange ring (“doughnut”) show the extent to which humanity (it is alleged) is shortfaling on this social foundation. The book also asserts that a dominant cause of the social shortfall can be attributed to

extremely uneven wealth distribution with a very small percentage of the population holding the vast majority of world wealth, The doughnut shaped ring between the social foundation and the ecological ceiling is the sweet spot where we need to be - the place where we “thrive”. The book then examines the consequences of this proposition and develops the argument that GDP is a totally inadequate measure of progress. Moreover, it is an almost inevitable consequence of using GDP as the success measure that wealth will accumulate in the hands of the few, making matters worse. Alternatives are explored. It seems there is a growing band of economists that support this (or a very similar) approach to economics. But it challenges conventional economic theory in a major way. It leads to a dilemma expressed in the book as



“We have an economy that needs to grow whether or not it makes us thrive”

OR

“We need an economy that makes us thrive, whether or not it grows”

The interesting thing is that the doughnut model goes well beyond climate change and incorporates other wellbeing aspects such as pollution (e.g. plastics in the ocean, linked to biodiversity issues; social equity etc). So, whether or not you believe climate change is happening, a clear mathematical issue is that exponential growth must, surprisingly quickly, overwhelm the resources of the planet.

This [TED presentation by Kate Raworth](#) sets out very succinctly the key points. There is a [more detailed presentation at the Resurgence Trust](#). The production quality leaves something to be desired, so it may be best to skip the introduction. The discussion adds useful insight.

1.5 Adaptation Will Prevail

The ideas developed in Doughnut Economics mesh well with Steven Koonin’s conclusion that the IPCC “Top Down” approach will not work and will inevitably be replaced by a “Bottom Up” strategy as set out in this slide taken from his presentation.

Steven E. Koonin, Ph.D.– What Climate Science Tells Us, What it Doesn’t and Why it Matters.

Adaptation will be the dominant response

- It is **agnostic**
 - indifferent to natural vs human-caused changes
- It is **proportional**
 - adapt more if the change is greater
- It is **local**
 - politically palatable as spending is “here and now”
 - does not require global consensus
- It is **autonomous**
 - It will happen on its own
- It is **effective**

Local initiatives abound, and many are low hanging fruit that will command local political and electoral support. For example, the pollution in cities like Los Angeles, Delhi, Beijing, Sao Paolo and many more is serious. Reducing it will command widespread public support.

Other areas may be less obvious, but a TED talk by Allan Savory titled [“How to green the world's deserts and reverse climate change”](#) is just one example. It is clearly an ADAPTATION to an existing climate situation that depends on BOTTOM-UP LOCAL initiatives. The talk serves up several examples of how it is already working in several places.

In Canada, there is another fine example of adaptation deriving from the work of [Suzanne Simpard](#) on forestry management. For decades, forestry management in Canada had been based on clearance felling followed by mono culture replanting. Having been brought up in a traditional logging family, Suzanne Simpard was fascinated by the way the forest worked and over many years came to understand how, through the fine network of below ground fungi filaments, the trees exchange carbon, minerals and even defences against disease and predators. Complex networks, of exchanging essential chemicals involving even bears and salmon were discovered. These networks even worked across species. When Suzanne published her research, with the implication that clear cutting followed by mono culture was not the correct strategy, she was severely attacked by the forestry establishment. However, it came to be realised that understanding these complex webs between trees offered a path to enable foresters to manage climate change in the Canadian and other forests, her reputation was re-established, and her ideas are being closely studied worldwide. In a TED presentation, titled [“Nature’s Internet”](#), she sets out the basic concepts; and a more detailed presentation titled [“Mother Trees and the Social Forest”](#) (though a little technical in places) helps understand the concepts.

1.6 Finding a way Forward

Perhaps the mad dash for Net Zero should be attenuated. However, the wider view demonstrated by Kate Raworth indicates that there are other reasons for avoiding the excess use of fossil fuels. David Mackay listed 3 main reasons as being (a) moderating the use of a finite resource (b) energy security which in 2022 is a self-evident concern and (c) mitigating Climate Change, to which I would add (d) the avoidance of pollution. It is this last item that could generate common ground. I have already mentioned pollution in cities, but there are many other pollution sources such as

- Plastics in the ocean
- (reduce/eliminate production of single use plastics)
- Reduce river pollution (massively reduce agricultural runoff and retention of natural fertilizers)
- Increase fertilizer efficiency
- Reduce transport emissions (e.g. use of hydrogen derivatives in shipping, aviation and heavy goods)
- Reduce industrial emissions from production of steel, fertilizer and cement
- Elimination of SO_x and NO_x

In most cases improvements in any of these (and other related) fields would automatically reduce the use of hydrocarbons. On the plus side, the gains for biodiversity and human health are obvious. In all cases (with the possible exception of international transport) the justification for action is local and within the power of the local population/government. International agreements are not required. It is, once more, a bottom-up strategy. Even the international transport industries appear to be responding to public pressure to reduce pollution (noise and emissions), starting initially at the ports and airports, but also taking in wider environmental and biodiversity pressures too.

Some caution may be needed because it has become clear that the increase in CO2 in recent years has resulted in a greener planet with longer growing seasons (See Tom Gallagher presentations). Indeed, it is suggested by some that CO2 levels had reached dangerously low levels in the immediate pre-industrial period, and further reductions would threaten the natural photosynthesis cycle. We are currently at about 400+ppm and it is suggested that about 1000ppm is the optimum for plant growth. A carefully balanced approach is needed.

1.7 What about Tipping Points?

The table on the right is taken from an article in Science magazine, Sep 2022. It shows a list of tipping points, their possible impacts, and the timescale when they will become significant. Only a few have a *minimum* timescale of less than 100 years namely

Irminger Sea/ SPG convection: 5 - 50 yr

Amazon Rainforest dieback: 50 - 200 yr

Boreal Permafrost collapse: 10 - 300yr

Arctic Winter Sea Ice collapse: 10-100 yr

Mountain Glaciers Loss 50-1k yr

Sahel and W African Monsoon (greening) 10-500yr

These times are based on current model predictions of Climate Change, and both Koonin and Gallagher suggest that such model predictions are likely to be wrong, and that the reality, if the tipping points occur at all, is likely to take longer than the models predict.

Adaptation to items listed above is probably well within current human capability. Then there will be plenty of time to work out adaptation strategies for more serious events such as

Table 1. Table showing our literature-based threshold, timescale, and impact estimates for the tipping elements we categorize as global core or regional impact. Element acronym colors indicate Earth system domain (blue, cryosphere; green, biosphere; orange, ocean-atmosphere), and element name and estimate colors indicate subjective confidence levels (green, high; yellow, medium; red, low). Bolded element names indicate elements featured in previous climate tipping element characterizations.

Category	Proposed climate tipping element (and tipping point)	Threshold (°C)			Timescale (years)			Maximum impact* (°C)	
		Est.	Min	Max	Est.	Min	Max	Global	Region
Global core tipping elements	GrlS Greenland Ice Sheet (collapse)	1.5	0.8	3.0	10k	1k	15k	0.13	0.5 to 3.0
	WAIS West Antarctic Ice Sheet (collapse)	1.5	1.0	3.0	2k	500	13k	0.05	1.0
	LABC Labrador-Irminger Seas/SPG Convection (collapse)	1.8	1.1	3.8	10	5	50	-0.50	-3.0
	EASB East Antarctic Subglacial Basins (collapse)	3.0	2.0	6.0	2k	500	10k	0.05	?
	AMAZ Amazon Rainforest (dieback)	3.5	2.0	6.0	100	50	200	Partial: 30 GtC/0.1°C Total: 75 GtC/0.2°C	0.4 to 2.0
	PFTP Boreal Permafrost (collapse)	4.0	3.0	6.0	50	10	300	125-250 GtC/ 175-350 GtC/ 0.2-0.4°C	~
Regional impact tipping elements	AMOC Atlantic M.O. Circulation (collapse)	4.0	1.4	8.0	50	15	300	-0.50	-4 to -10
	AWSI Arctic Winter Sea Ice (collapse)	6.3	4.5	8.7	20	10	100	0.60	0.6 to 1.2
	EAIS East Antarctic Ice Sheet (collapse)	7.5	5.0	10.0	?	10k	?	0.60	2.0
	REEF Low-latitude Coral Reefs (die-off)	1.5	1.0	2.0	10	~	~	~	~
	PFAT Boreal Permafrost (abrupt thaw)	1.5	1.0	2.3	200	100	300	Abrupt thaw adds 50% to gradual: 10 GtC/14 GtC/ .04°C per °C @2100; 25 GtC/35 GtC/ .11°C per °C @2300	~
	BARJ Barents Sea Ice (abrupt loss)	1.6	1.5	1.7	25	?	?	~	+
	GLCR Mountain Glaciers (loss)	2.0	1.5	3.0	200	50	1k	0.08	+
	SAHL Sahel and W. African Monsoon (greening)	2.8	2.0	3.5	50	10	500	~	+
	BORF Boreal Forest (southern dieback)	4.0	1.4	5.0	100	50	?	+52 GtC/ net -0.18°C	-0.5 to -2
	TUND Boreal Forest (northern expansion)	4.0	1.5	7.2	100	40	?	-6 GtC/ net +0.14°C	0.5-1.0

*Feedback strength in °C per °C for abrupt permafrost thaw is calculated relative to preindustrial and declines with further degrees of warming (by ~21% per °C).

significant sea level rise (including, if necessary, geo-engineering).

In the meantime, we must increase our understanding of what is happening, including:

- Better understanding of the impact of human activity on the environment
- Better understanding of long term climate trends arising from climate history
- Preparation for adaptation measures likely to be required to cope with tipping point events that are considered ‘imminent’.

It is time to stop scaring the population about events beyond our capability to predict them.

1.8 Stop Press

In Nov 2022, the Journal of Climate published a paper by a group of scientists from leading climate institutions which suggests that the effect of carbon dioxide this century might be small if not undetectable when compared to natural climate variability. It posed the question [“Is Anthropogenic Global Warming Accelerating?”](#)

Commenting on the paper, Dr David Whitehouse, Science editor of Net Zero Watch said

“Global surface temperature is, and always has been, the key climate parameter. Whatever is happening to the Earth’s climate balance, it must, sooner or later, be reflected in the global annual average temperature, and not just in regional variations. But therein lies what is to some an inconvenience as the changes in the global temperature this century is open to differing interpretations including the suggestion that increases in anthropogenic greenhouse gas emissions are not needed to explain the changes we have seen in the last 20 years or so.

“It’s a conclusion that many would dismiss as coming from climate “sceptics,” or downright deniers. But what if it’s the view of scientists from two of the world’s leading institutes researching climate change; the University of Oxford and the US National Center for Atmospheric Research. Then it must be taken seriously and not dismissed offhand.

“It is important research because it is the trend in the increase of global temperature caused by anthropogenic greenhouse gas emissions that is most important variable for policymakers considering the scale and timescale of action in the coming decades. However, this vital parameter is uncertain because recent decades have shown that were are living through a period of considerable natural climate variability.”

These conclusions seem broadly in line with the conclusions of Tom Gallagher. It illustrates how rapidly new science is coming forward, seeking to question the apocalyptic conclusions deriving from the IPCC process. That Climate Change is occurring is not in doubt. But it would appear that forecasts of the scale and pace of the change, and the attribution to anthropogenic causes could be well off the mark.

1.9 Conclusions

In conclusion, I assert that the lessons of history show that most (if not all) of the recent climate changes have their origins in natural causes, but that human influences could increase over time. (This means that any assistance, technical or financial, offered to developing nations to adapt should be regarded as Aid and not Reparations or Compensation).

I simply reproduce one of the final slides from Tom Gallagher's lectures.

Time to Rethink our Climate Assumptions

- **Climate Change is much more complex and poorly understood than has been presented to the public.**
- **The IPCC was created to study only one period of warming, not the history of Climate Change.**
- **Integration of Real Historic Causes and Effects is still sadly missing.**
- **Notions and Theories are constantly being challenged and changed by experimental and real observational science.**
- **There are real costs to assuming that "The Science is Settled" or that the future can be easily projected in a computer model.**
- **Politics, "Popular Thinking" and Bias have no place in Scientific Discovery and Enquiry.**

And from Steven Koonin's presentation

Koonin's recommended course forward

- Cancel the "climate crisis", but acknowledge the task/challenge of reducing human influences
 - Better non-expert presentations of the science and the technologies
- Better observations and understanding of the climate
- A greater focus on adaptation (framework, costs)
 - Promote development and resilience in developing countries
- Develop and demonstrate emissions-lite technology
 - Fission, grid storage and management, batteries, non-carbon chemical fuels, ...
- Formulate graceful decarbonization pathways that incorporate technology, economics, regulation, behavior
 - Implement as necessary

Precipitous "climate action" is a far greater threat than "climate change"

Graham Rabbitts

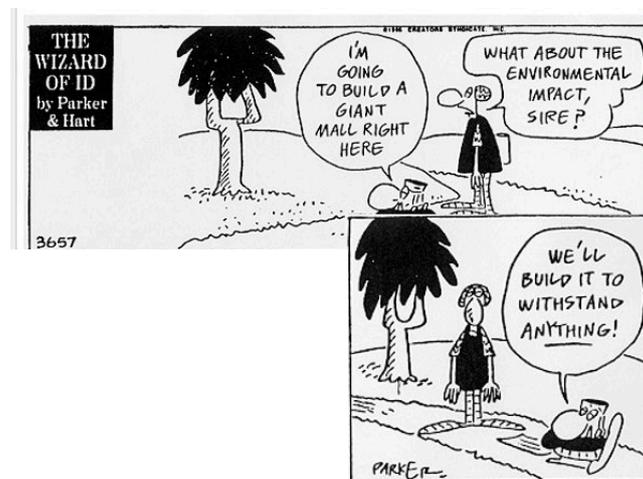
December 2022 - updated March 2023

Part 2

Developments post IPCC SPM and UK Budget

“We do not believe any group of men adequate enough or wise enough to operate without scrutiny or without criticism. We know that the only way to avoid error is to detect it, that the only way to detect it is to be free to inquire. We know that in secrecy error undetected will flourish and subvert”. –

J Robert Oppenheimer



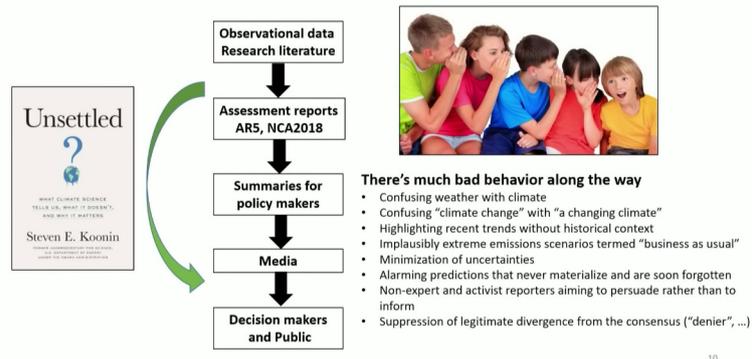
Refocusing Climate Change

2.1 IPCC “Summary for Policy Makers”

The final act of IPCC at the end of the update cycle is to produce the “[Summary for Policy Makers](#)” (SPM). This is probably the only IPCC document read by anyone (incl media and politicians) other than real scientists! It is therefore the most influential report. However, it is produced at the end of a long chain of what we call “Chinese whispers” and the Americans call “Telephone”. This is well explained in a slide from a presentation by Steven Koonin. The Research literature is

prepared by the research scientists; then the Assessment Reports (AR6 is the latest) are prepared by scientists appointed by member governments of IPCC. Finally, Summary for Policy Makers (SPM) is written by officials who may or may not be scientists appointed by government. All governments must agree and sign off the SPM. This may involve compromise and some political pressure. If there is a disagreement between the SPM and the AR then the AR is adjusted to agree with the SPM! Further headline grabbing sensationalism can be added by media and politicians. It was this flawed process that led Steven Koonin to write his excellent book “Unsettled”. (See section 1.1 above for further detail).

The telephone game turned science into “The Science”



Paragraph A1 of the SPM published on 21st March 2023 states

“It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred”.

It is suggested that this bold assertion is seriously challenged by much of the science described in Part 1 of this essay. Without this starting assumption, much of the rest of the SPM loses credibility.

Part B of the SPM is the IPCC view of possible climate futures. In view of the serious criticism by Steven Koonin and Tom Gallagher of the current climate models on which the forecasts are based, referred to in Part 1 of this essay, serious doubt has to be cast on these predictions. A report by [Richard Lindzen](#) et al, a respected climate scientist, titled “[An Assessment of the Conventional Global Warming Narrative](#)” underlines this view and challenges the role of CO2. In short, the IPCC process seems to be fatally flawed. The tragedy is that governments the world over have developed seriously costly policies, including binding Net Zero commitments in some countries, based entirely on the IPCC process.

In the remainder of Part 2 of this essay, the climate change aspects of the recent UK budget will be briefly explored, followed by a review of some of the consequences of the current UK Net Zero strategy.

2.2 Consequences of IPCC policies

"[False Alarm!](#)" by Bjorn Lomborg, was written before the Pandemic (and Ukraine). It uses the widely used IPCC version of the effect of CO2 on climate and examines current responses by governments to demonstrate that (a) the cost is excessive and the burden falls on the less well off leading to what we now call a "cost of living crisis". (b) it will achieve remarkably little. (There is a very good [presentation by Bjorn Lomborg](#) that skims over the topics in the book in 40 minutes, followed by a good discussion)

There is growing evidence that CO2 is only a minor contributor to climate change, but climate change is happening, driven more by astronomical cycles, ocean currents, and the effects of clouds and water vapour, all of which are hardly taken into account in current climate models. The science behind these statements are all referred to above. There is also growing evidence that recent increases in CO2 have resulted in a remarkable increase in plant activity and a lengthening of the growing season.

2.3 More False Alarms

2.3.1 Are Polar Bears declining?

It is hard to say whether or not polar bear populations are in decline . But the facts are that in 2017, Dr [Susan Crockford](#) was dismissed from Victoria University in Canada apparently for asserting that polar bear populations were healthy. She had discovered that teachers in schools were saying that there were only a few thousand polar bears left, but she stated that the 2015 IUCN Red List put the global population size at 22,000- 31,000. In March 2023, the IUCN Red list page for Polar Bears gives no figures at all, and classes the Polar Bear as "Vulnerable", which is much better than "Endangered" or "Critically Endangered". These are very murky waters! One can only say that some populations of polar bears seem to be thriving - e.g. on Svalbard; others are declining; and many are not known.

It seems the most important action to save Polar Bears has been the ban on hunting, but there is legitimate concern about the loss of sea ice at the north pole region. The assertion that the ice has never retreated in (geologically) recent times is challenged by some comments in a paper titled "[Extracts from "Doubt & Certainty in Climate Science - Alan Longhurst, 2018"](#)". [I have only seen a revised version of a published paper. It is not known whether the revision affected this statement or was ever published or peer reviewed]. The paper states that

Quote

From page 205

The attitude of NASA is contagious. A press report on climate research on Svalbard and in Norway described interviews with scientists then working at Longyearbyen, who talked of the recent period of sea-ice loss and glacier retreat as if it were a unique and novel event - no mention is made of the conditions that so impressed Captain Ingebrigstsen almost a century previously

Elias Kane, sent by the US Government in search of Franklin in 1852, had a wider view than this. Faced by the frequent evidence of Inuit occupation far to the north of their actual homes, and by open water in the Kennedy Channel at about 82deg N 'as far as the eye could see' he had no such qualms: 'I would respectfully suggest ...whether it may not be that the Gulf Stream, traced already to the coast

of Novaya Zemlia, is deflected by that peninsula into the space around the Pole...it would require a mean change of only a few degrees to develop the periodical recurrence of open water’.

So the man who had seen it all at first hand during three hard years on the ice - and had measured and recorded what he saw - was not impressed by the permanence of Arctic climate conditions!

unquote

It seems the melt in that year was much more severe than has happened in recent years, and it seems the Polar Bears coped with that.

2.3.2 Loss of the Greenland Icecap

From the same source as above, Alan Longhurst comments

quote

From para (8.4) - Is the loss of the Greenland ice cap imminent? (P205)

Dominating the geography of the Arctic, Greenland has become one of the paradigms of climate change. The theoretical loss of the Greenland ice cap is unfortunately often described in apocalyptic terms, even in serious science journals: an ‘irreversible meltdown’ was invoked by a Nature journalist in 2012 in an article entitled ‘Climate change: losing Greenland’. The title of this essay was drafted as a statement, not a question, even if the text was less alarming than the title. The current loss rate of the Greenland ice sheet is around 600-650 gigatons/yr. from the total mass of just under 2.5×10^6 gigatons so we risk ‘losing Greenland’ (to use Nature’s expression) no sooner than in about 15,000 years at present rate of loss.

Unquote

Alan Longhurst seems to be one of a growing number of research scientists who have retired and therefore no longer need to seek research grants, so can speak freely about their concerns. [His Wikipedia page](#) is extensive

2.3.3 Coral reefs are disappearing?

This is a story that really suits the purveyors of gloom. When a coral bleaching event occurs, large areas are seemingly devastated - and indeed they are, but they can and do recover. The data on coral reefs has only recently been available and assumptions that coral bleaching has not happened before, or invasions by Crown of Thorn starfish are unique events turn out to be false. One academic in Australia, [Dr Peter Ridd](#), spoke out against the conventional cataclysmic view which was laying the problem at the door of climate change. He was hounded out of his post at Cook University, In 2019. After Dr Ridd had used crowd funding to fight his case in the courts, he was awarded A\$1.2 million by the Federal Circuit Court. But the University appealed . Eventually, late 2021, [Dr Peter Ridd lost his court case](#), on the grounds that his employment contract took precedence over his freedom of speech! But he fights on and continues to lecture on the subject, as shown in this talk titled “[Is the Great Barrier Reef threatened](#)”. The talk also explores the issue of free speech (toward the end). It is a seriously worrying venture into the choice between misinformation and freedom of speech.

2.4 The UK 2023 Budget

The context of this budget has been a serious Cost of Living crisis in the UK, and a massive rise in energy costs. It is repeatedly alleged that this set of problems is a direct result of the Covid 19 pandemic and the invasion of Ukraine by Russia, but government is wrong to use these events as the sole excuse. While there is no doubt both of these factors have had considerable influence, the Conservative government is not minded to acknowledge that unless and until the benefits of Brexit come to fruition, Brexit has had an adverse effect on UK wellbeing. Also, the dash for Net Zero and the impact of a rapid investment in renewable energy and the way in which it is financed could be contributory to the high cost of energy.

In a report in 2017 titled "[Cost of Energy Review](#)" (i.e. before Brexit, the Pandemic and the Ukraine war) the author, [Dieter Helm](#) stated in the summary

"The cost of energy is too high, and higher than necessary to meet the Climate Change Act (CCA) target and the carbon budgets.....Households and businesses have not benefited as much as they should because of legacy costs, policies and regulation, and the continued exercise of market power.....The legacy costs from the Renewables Obligation Certificates (ROCs), the feed-in tariffs (FiTs) and low-carbon contracts for difference (CfDs) are a major contributor to rising final prices, and should be separated out, ring-fenced, and placed in a 'legacy bank'. They should be charged separately and explicitly on customer bills. Industrial customers should be exempt. Once taken out of the market, the underlying prices should then be falling"

The 2023 Budget made no attempt to address these structural issues. Instead, there was considerable focus on alleviating the high energy costs for households and certain industrial sectors. Nothing wrong in that, but these actions are tactical sticking plasters,

There are other technical reasons to be concerned about the effect of current energy policies that will be reviewed later in this essay (see para 2.5)

Over recent months, there has been growing concern regarding the ability of the electricity grids in all major countries to cope with the intermittent availability of the main renewable energy sources, i.e. wind and solar. These concerns will be elaborated later in this essay(see section 2.5). However, the Chancellor tried to show he was listening by announcing that he would fund a program of constructing small modular reactors to cope with the problem. However, conventional wisdom is that the high initial cost of nuclear plant (and low unit production costs thereafter), coupled with a severely limited capability of nuclear reactors to respond rapidly to changing demands make nuclear power most suitable for base load use. It would therefore appear that the Chancellor's proposed solution is unlikely to work, unless some new as yet undisclosed factors are associated with small modular reactors.

2.5 Will 'Net Zero' work?

A Technical assessment of a net zero strategy, by [Richard Lindzen](#) et al is titled "[Challenging 'Net Zero' with science](#)". The following extract from the summary is fairly devastating

"In our scientific opinion, all of these "Net Zero" regulations and actions are scientifically invalid and fatally flawed science because they:

A. Fabricate data or omit data that contradicts their conclusions, for example, on extreme weather.

B. Rely on models that do not work.

C. Rely on IPCC findings, which are government opinions, not science.

D. Omit the extraordinary social benefits of CO2 and fossil fuels.

E. Omit the disastrous consequences of reducing fossil fuels and CO2 emissions to "Net Zero".

F. Reject the science that demonstrates there is no risk of catastrophic global warming caused by fossil fuels and CO2."

However, such is the political inertia that we seem to be committed for the time being to a 'Net Zero' path. Prof Michael Kelly conducted an exercise in which he assumed he was tasked to deliver Net Zero. While casting doubt on some of the climate science, he sets such doubts aside and examines - with a broad brush - what would be required to achieve Net Zero carbon in the UK by 2050.

It is a most interesting report titled "[Achieving Net Zero](#)". Of course one could quibble over detail, but the broad thrusts of the report are clear:-

- *There is insufficient time to achieve net zero by 2050 (we should have started in 2000)*
- *There are possibly insufficient material resources (mainly minerals) that can be made available at the rate required*
- *There is insufficient time to recruit and train an NHS size workforce to implement the changes in the UK*
- *There is unlikely to be public buy-in.*
- *There is no roadmap to success, just an aspiration*
- *The organisational and financial resources at national and transnational scale to support the non-existent roadmap have not been developed*
- *Unless there is a worldwide commitment then action by the UK, however commendable, will be ineffective*
- *If we cannot make mitigation work, then we will have to rely on adaptation to inevitable climate changes (though even that seems to be a fast-moving target!)*
- *Having the cars and heat-pumps without the green electricity is the height of folly*

Continued on next page

Experienced engineers have emerged to describe serious difficulties with generation and management of the national grid. Here is a small selection of papers in this category:

- [“The Economics of Wind Power”](#) Andrew Montford
- [“Rewiring the UK - the hidden cost of net zero”](#) Mike Travers
- [“The Inadequacy of Wind Power”](#) Wade Allison

2.6 State of the Climate 2022

There are numerous “State of the Climate” reports. Most follow the catastrophic mantra that we have heard so often. But [“State of the Climate 2022”](#) by [Ole Humlum](#) is based strictly on published data. In a sentence, it suggests the climate is changing, but not to an extent that requires immediate action. Some major uncertainties are highlighted. The [wikipedia page for Ole Humlum](#) is extensive, but he is described as a “climate change denialist”. That is probably inaccurate as he accepts that the climate is changing, and his state of the climate report cites published scientific data, and contains many references to work by other scientists well established in the field. The term “Climate Sceptic” may be more appropriate. One possible criticism is that the arguments put forward rely mainly on satellite data, so the time series are very short (which the authors acknowledge). With that warning, the report makes interesting reading.

2.7 And now what?

We have established, right at the beginning of Part 1, that there could be four reasons for reducing our dependence on fossil fuels. The top-down IPCC process has been discredited, but the ultimate goal of reducing fossil fuel dependency remains. But we need a plan that is likely to succeed and will not result in a poor economic outcome. We are seeking to increase our overall well being.

We need to create a road map that will ensure that

- The role of renewable energy generation, if any, and including the costs of intermittency is properly evaluated
- A realistic assessment is made of all alternative energy sources is made (including nuclear fission, thorium reactors, nuclear fusion, geo-engineering, etc)
- There is enough electricity to power cars, (trucks), heat pumps,
- There is a national grid capable of delivering the power to where it is needed
- Define the energy systems for road transport (batteries and/or hydrogen/ ammonia. or ‘other’)
- Ensure the generation capacity and distribution for the road transport systems are in place
- Define the energy systems (hydrogen (derivatives)and alternatives?), through international agreement, for shipping and aviation, [not covered in Kelly report, but see [“Zero Carbon Ship”](#) by Graham Rabbitts]

- Develop the manufacturing and distribution systems for aviation and shipping fuels.
- Ensure there is enough capacity to provide energy to ports and airports to enable them to meet emerging energy standards
- There are enough materials to build the batteries, the home insulation, the heat pumps, and the new power stations
- Create and manage the standards (domestic and international) that will be required to sustain the transition
- Plan the labour force that will be needed to support such a programme
- Set up the financial and regulatory systems that will be needed to keep such a complex system in balance

(Also see the proposals made by Koonin and Gallagher in section 1.9 above)

This will almost certainly require abandoning a 2050 net zero goal in favour of something

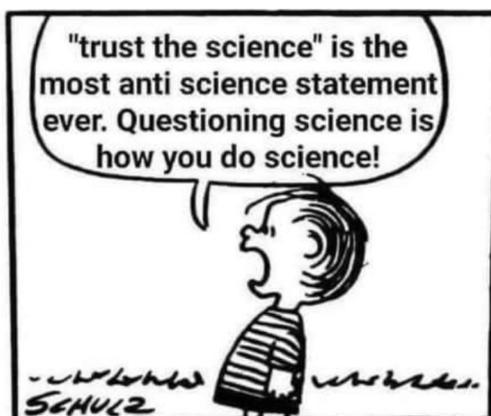
1. more realistic
2. less expensive and disruptive in the short term
3. addressing the right issues

Above all, refocus the science community to reexamine the scientific priorities to avoid wasteful expenditure

Steven Koonin in [an online debate](#) which proposed that “*Climate Science compels us to make large and rapid reductions in greenhouse gas emissions*” argued that

- *The proposition is unjustified* *Needn't do it*
- *The proposition is immoral* *Shouldn't do it*
- *The proposition is fantastical* *Can't do it*

The political realities are that the stresses created by the Ukraine war are already leading to an unravelling of Net Zero targets across Europe and elsewhere. The time has come for a major policy rethink.

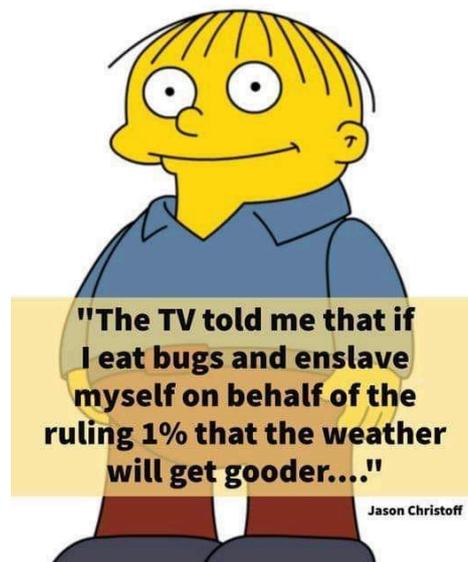
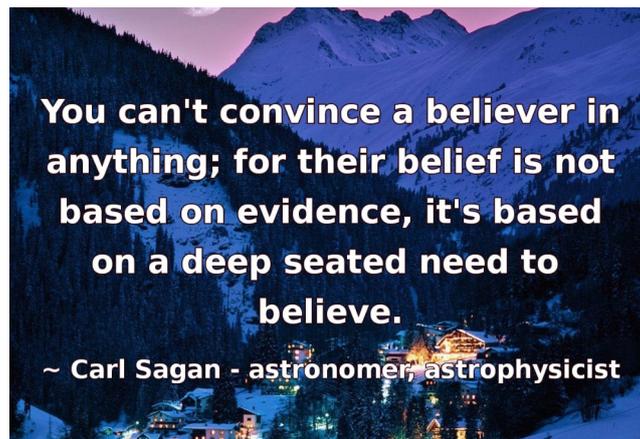


Part 3

Retreat from Net Zero?

For a successful technology, reality must take precedence over public relations, for Nature cannot be fooled.

Richard P. Feynman



Refocusing Climate Change

3.1 DESNZ

In early 2022, the NGO Client Earth alleged that UK Government's net zero strategy was inadequate. Client Earth then teamed up with Friends of the Earth and Good Law Project for a full hearing in the High Court where their claims were heard together. They won their case.

On appointment as Prime Minister, Rishi Sunak created a new department, "Department of Energy Security and Net Zero" (DESNZ) to address the problem, Grant Shapps, a former secretary of state for Transport, was appointed to lead the department. A primary task was to respond to the court judgement.

The High Court had found that the UK government's net zero strategy, which sets out plans to decarbonise the economy, did not meet the Government's obligations under the Climate Change Act to produce detailed climate policies, that show how the UK's legally-binding carbon budgets will actually be met.

So on 23rd March 2023, DESNZ published a raft of papers announcing numerous plans, programs and targets. The three principal reports, under the generic title "[Powering up Britain](#)" cover:-

- Overview
- Net Zero Growth Plan
- Energy Security Plan

There were several other supporting papers too. It is a major work and it is clear that a great deal of expertise has gone into producing the plans, programs, and budgets. Welcoming the report, the PM. Rishi Sunak, asserted that UK was a world leader in reducing emissions. He claimed that UK had reduced emissions since the Kyoto agreement by almost 50% - though this is a little disingenuous because over the same period UK had significantly de-industrialised and now imports the same emissions built into the imported goods. Emissions consumed is a fairer measure than emissions directly generated.

The Reports are stuffed full of initiatives with mind boggling sums of money promised. Obviously the main thrust is to rush out renewables, hydrogen and Carbon Capture, Use and Storage (CCUS). There is a lot of sensible stuff about how to build and connect the network. But at no point is there any sign of the calculation about how to cover the intermittency of wind and solar. (indeed the word intermittent or intermittency does not appear in any of the 3 main reports). There is a sort of implicit assumption that it will be covered by provision of hydrogen (which of course can be manufactured when there is excess wind and solar power) but there is no indication of the amount of storage that would be needed nor of the extra generating capacity that would be needed to maintain the storage (pressure and temperature).

There is a standard Sir Humphrey ploy which is one degree higher than "divide and rule" known as "confuse and conquer". One provides so much information that the reader is overwhelmed, and fails to look for what is NOT included in the report. The authors can say that "there is no evidence that the problem of renewables intermittency is serious" because *the question was never asked or addressed!* - even though this is a question often posed by Net Zero sceptics.

Also, in 2021, Boris Johnson confirmed plans to decarbonise the electricity grid by 2035. That commitment has been downgraded to an aspiration in the present documents.

Is it possible that some in DESNZ are beginning to doubt whether Net Zero is achievable (or even desirable)? Clearly it is politically impossible to even utter such thoughts, especially as a general election is approaching. The commitment to Net Zero has been enshrined in law, and embedded in popular thinking. Part 2 of this document (above) sets out several arguments suggesting that this is a tricky proposition at best.

3.2 Famine and feast!

The demand for electricity is highly variable, during each day, during each season, and in response to social pressures (e.g. major TV events create spikes in demand). The National Grid has become very skilled at managing these variations and delivering a very high availability of supply. The grid is now faced with new pressures, namely

- Desire to reduce dependency on fossil fuels
- The need to increase energy security (underlined by the Ukraine war)
- A re-invigorated nuclear programme
- The requirement to adapt to a significant input from renewable sources.

It is the last of these that poses the greatest difficulty even though it is not addressed in “Powering up Britain”. Solar power is only available when the sun is ‘visible’, with the power available being affected by weather variables. Wind and wave power is totally weather dependent. Records show that there can be periods lasting days when both wind and solar generation will be severely reduced (and in strong winds, wind generators have to be shut down to protect the mechanisms). So some form of balancing and storage of energy is needed to provide the high level of availability of supply that we have come to expect. Only tidal power is completely predictable, but it has proved difficult to develop robust affordable installations that have to operate in a hostile environment.

In part 1 of this essay (above), reference is made to a study by Francis Menton that demonstrates that the back up battery capacity required is colossal, incredibly expensive, and it is doubtful whether electricity can be stored in this manner for the long periods needed without incurring large losses.

It would appear that DESNZ have opted to address this problem by using hydrogen as a storage medium that can be used to balance the grid, though this is not explicitly stated in the “Powering up Britain” reports.

- In periods of low electricity demand, surplus generation can quickly be switched to manufacture green hydrogen by electrolysis of water
- The hydrogen generated will need to be stored (at high pressure and/or low temperature which will consume some energy to maintain storage conditions). Or it could be stored as a more easily handled derivative such as ammonia.
- When wind and or solar power are not available in the amounts required, then the stored hydrogen can be used to generate electricity to make up the

shortfall. This will require standby generating capacity to be available.

This strategy would seem to be feasible, and avoids some materials supply problems (e.g. lithium) but considerable extra costs will be incurred to provide and maintain the capacity required. No indication of the size and cost of these intermittency facilities is given in the “Powering up Britain” reports.

It should also be noted that these extra costs weaken the assertion that solar and wind renewables are cheap. These intermittency costs should be explicitly allocated against renewable generation.

At the same time the system must cope with

- Integrating demand management procedures. (e.g. direct consumer demand management and phased charging for electric cars (EVs)). Note the fuel mix for commercial transport ships and aircraft is still a matter of debate.
- Possible doubling of electricity demand to meet demand from heat pumps and commercial transport needs, EVs and demand from ports and airports.

What seems to be proposed is a very complex system and the model calculations to get it balanced in all respects are complex. DESNZ is a relatively new department, and this is a massive task. Until the model has been robustly completed, then it cannot be claimed that government has answered the court injunction. Moreover, there are still fundamental choices not yet made regarding fuel choices for transport (land sea and air), and the provision of fuel manufacturing and distribution systems internationally. The model will need to be changed many times as the preferred choices emerge.

But is silence the right answer? We cannot wait till the model is finished because it never will be. Projects of this magnitude (e.g Channel Tunnel, and HS2) rarely run to time and budget, so the practicality of Net Zero by 2050 seems unlikely.

3.3 The first cracks

Many governments set decarbonisation targets at COP26 in Glasgow. Since then, considerable stresses have been experienced across the world arising from the lack of gas, oil, food and fertiliser from Russia and the Ukraine. Some governments have quietly postponed their COP 26 commitments. More publicly, the EU, led by Germany and Italy, has abandoned the commitment to abandon the sale of fossil fuel driven cars by 2035, and UK has been forced to follow suit. Promises to make a switch to alternative non fossil fuels to be burned in internal combustion engines probably have little substance. In the USA new exploration licences for oil and gas have been announced.

The reports in “Powering up Britain” make it clear that considerable quantities of gas will be needed to generate blue hydrogen which is perceived as an essential component of achieving net zero. This has led to a major commitment to CCUS facilities, and the intention to award further exploration licences in the North Sea Basin. It is possible the decision to refuse fracking will also come under review.

The need for short term security of supply has also led to delaying the final closure of some UK coal fired power stations. The situation in Germany is even more extreme because of the choice to avoid the use of nuclear power.

There have been reports that Saudi Arabia is to assist China to build major new refining capacity.

3.4 Time to reconsider?

Consider

- The scientific appraisal by Dr Richard Lindzen et al described in para 2.5 above (and the works of Steven Koonin and Tom Gallagher)
- The claim that current climate changes can be explained without the need to include green house gas effects as expressed in the Nov 22 paper in Science in para 1.8 by prominent environmentalists
- The practical and ethical considerations expressed by Steven Koonin in para 2.6 above
- The scale, complexity and cost of the pathway to achieve Net Zero by 2050 as expressed by Prof Michael Kelly in para 2,5,
- The probability that current net zero plans will be costly and probably achieve very little as expressed by Bjorn Lomborg in Para 2,2
- The current Cost of Living crisis and energy security requirements
- The lessons from climate history as explained by Tom Gallagher in para 1.1
- The doubts cast on the accuracy of reporting from the IPCC process described by Steven Koonin in para 1.1 and para 2.1
- The inability of current climate models to produce useful forecasts as described in many places by Steven Koonin, Dr Richard Lindzen, Tom Gallagher and others.

In Para 2.6 a programme of work is suggested to address many of these issues. Indeed, much of the work in the “Powering up Britain” programme answers some of these issues. But so long as the starting assumption shown in para 2.1 is the assertion in paragraph A1 of the “Summary for Policy Makers” published by IPCC in March 2023, then its effectiveness and value has to be questioned in view of the list of issues shown above on this page. We have got the goal wrong.

We need to refocus Climate Change.

- There is no immediate climate crisis
- The role of greenhouse gases needs to be re-evaluated
- We need to focus on short term issues such as pollution
- Research needs to focus on elegant solutions to moderate human impacts in a balanced way at an orderly pace
- Research into adaptations to potentially imminent tipping points would be wise

As a final thought: In April 2023, during an interview with BBC, Elon Musk said “Freedom of speech is meaningless unless you permit people you do not like to say things you do not like”. I agree, provided that they do not do so anonymously. You should own up to your assertions.

Graham Rabbits:

April 2023