**IVAN JOHNSTONE’S PERSONAL BLOG POSTINGS IN CHRONOLOGICAL ORDER**

<http://www.insearchofsteadystate.org/personalblog.html>

**"The future is already here — it's just not very evenly distributed" - William Gibson.**

**14 January, 2017**

**Oil Exploration in New Zealand Waters**

According to the New Zealand Greenpeace [website](http://greenpeace.org.nz/climateaction/?utm_source=facebook&utm_medium=social&utm_campaign=climate&utm_content=hunting+the+beast) :

"The world’s biggest seismic blasting ship - known as “The Beast” - is exploring for oil in the seas between Kaikoura and Napier. Despite the climate crisis, the risk of catastrophic oil spills and the immediate harm done to marine life, Statoil and Chevron are exploring for new oil at the invitation of the NZ Government".

The New Zealand government does not understand or ignores that in order to avoid climate change above 2 degrees, 80% of current known oil reserves must stay in the ground. [Carbon Tracker](http://www.carbontracker.org)  warns that fossil fuel firms risk wasting $2 trillion on uneconomic projects in the next decade if they pursue business as usual strategies. A COP21 Carbon Asset Risk conference was held in 2015. In a [YouTube video](https://www.youtube.com/watch?v=QTraGPeVjZ0) of one of the proceedings, fund managers of major pension funds demonstrate 57 minutes 53 seconds into the video that they are well aware of Carbon Asset Risk and have subsequently disinvested in the fossil fuel sector. It is shameful when a government charged with acting on behalf of the Public Good lags behind the private sector.

**19 February, 2017**

**An Example of Misinformation and Propagation Over the Internet**

The website <https://archive.org/details/Ecoscience_17> provides the following synopsis of the book *"Ecoscience"* which is listed as being authored by John P. Holdren:

"In [sic]1977 book, John Holdren advocated forced abortions, mass sterilization through food and water supply and mandatory bodily implants to prevent pregnancies"

The book *“Ecoscience: Population, Resources, Environment”* was first published in 1970. I purchased the 1977 publication in 1978. From memory the book did not advocate “forced abortions, mass sterilization through food and water supply and mandatory bodily implants to prevent pregnancies." To double check this, I downloaded the PDF version of the book and did a search of the keywords "abortion", "sterilization", and "pregnancy". The book provides comprehensive and detailed histories of birth control, abortion, and sterilisation that have been carried out in various countries. The book does not advocate “forced abortions, mass sterilization through food and water supply and mandatory bodily implants to prevent pregnancies." Instead, the book addresses the serious issue of over population growth and advocates the ultimate need for zero population growth by way of voluntary birth control because any form of growth cannot continue forever.

The 1977 publication of Ecoscience was co-authored by Paul R. Ehrlich, Anne H. Ehrlich, and John P. Holdren. In 1977 Paul Ehrlich was a Professor of Population Studies at Stanford University, Ann Ehrlich was a Senior Research Associate in Biological Sciences at Stanford University, and John Holdren was an Associate Professor of Energy and Resources at the University of California. Paul Ehrlich wrote the chapters on population which addressed birth control and not John Holdren. The claim "John Holdren advocated forced abortions, mass sterilization through food and water supply and mandatory bodily implants to prevent pregnancies" is incorrect and libellous.

The above website invites readers to write book reviews and claims that reviews would be vetted before being posted on the website. I wrote more or less the same text as the above blog finishing with advice to remove the libellous statement. To my surprise my advice was posted as a book review. The above website is an example of how lack of proper vetting and double checking of information content can not only lead to propagation of misinformation over the Internet, but also a continuation of misinformation. A PDF copy of the above website page as of 19 February 2017 which includes my “book review” can be downloaded [here](http://www.insearchofsteadystate.org/downloads/Misinformation.pdf)

**26 April, 2017**

**Climate Change and Peak Oil: What Now?**

With regards to climate change and peak oil, I am an optimistic pessimist. I want there to be and hope for a smooth and peaceful transition to a stable steady state economy for all nations with greater equity between and within all countries. However, given the multiplicity of information and data from diverse and what seem to be the most reliable sources of information, I fear that the future before 2050 will be strife for millions around the globe. Society has ignored warning signals about both climate change and peak oil over the past 40 years and tends to respond only to emergencies. I suspect that even now insufficient action will be taken in New Zealand and other countries to address the issues of climate change and peak oil. If so, then ensuing problems and strife will continue to multiply and escalate. In the extreme, there could be a Third World War where nuclear weapons are used.

New Zealand is naturally endowed with hydro and geothermal resources and is currently able to generate 80% of its total electricity demand using these renewables including wind power. So long as current global strife does not degenerate into World War III, New Zealanders should fare OK in the long term on a lower than current total energy consumption per capita using solely renewable energy-based electricity generation. Hopefully we will add sufficiently more renewable energy-based electricity generation, but there are likely to be teething pains on the way. In order to retain a national rather than a village society, we need to invest now rather than later in the necessary infrastructure for an electricity-based railway system linking cities otherwise each and every town and city will need to achieve greater self-sufficiency. Multiple duplication of manufacturing in each town and city would result in a greater cost for each town and city. If the additional costs cannot be met, then the consequences would be a much simpler lifestyle than what we could achieve otherwise. The same applies in terms of renewable based energy transport systems between countries and self-sufficiency within each country. For example, are we able to manufacture computers in New Zealand without importing necessary components? If not, then what form of renewable energy will be used in the future for transport of desirable if not essential components and resources between countries? Provision of transport between countries using only renewable energy is far more problematic than providing electricity-based transport systems linking cities within a country.

The Comalco aluminium smelter at Tiwai point in Bluff currently uses 13% of New Zealand’s total electricity generation. A related decision to New Zealand investing in an electricity-based transportation system linking cities is the decision of when and whether to scrap Comalco entirely or to downgrade the level of production of aluminium for domestic use only. New Zealand currently uses non-renewable energy to generate 20% of its total electricity. The argument that aluminium can be produced more efficiently here in New Zealand than in another country because its production uses solely renewable energy sources doesn’t hold water because New Zealand doesn’t have a surplus of hydro and geothermal energy that can be earmarked as being used by Comalco. The energy currently used by Comalco could be diverted to use by an electric railway system linking cities which would in turn enable a reduction and eventual elimination of fossil fuels currently used by trucks transporting goods between cities.

The question as to what are the true benefits and costs of continuing to supply Comalco with electricity needs to be addressed and debated, especially given New Zealand’s commitment to the Kyoto Protocol and the more recent Paris Agreement.  Do the benefits of employment for New Zealanders working at Comalco outweigh the costs of using non-renewable energy that is needed in order to match the total electricity demands of New Zealand? It may be that the benefits of employment currently do outweigh the costs, but this cannot continue forever under conditions of peak oil where not only the rate of energy supply continually declines and can no longer match the previous rate of demand at the peak, but the Energy Return on Energy Invested (EROI) also continually declines, a double whammy. The true benefits and costs of continuing to supply Comalco with electricity need to be established and monitored on a regular basis and appropriate decisions need to be made.

One other hope I have is that New Zealand does not degenerate into a totalitarian society should problems ensuing from climate change and peak oil multiply and escalate. It dismays me when one third of our voting population do not vote at national elections. It would be a disaster if discontent of voters in New Zealand should result in a majority support of a demagogue by default. Everyone entitled to vote in New Zealand should vote so as to ensure that we maintain a democracy.

**09 July, 2017**

**A realistic Approach to Future Urban Transport**

This is a realistic approach to future urban transport compared to putting electric motors and batteries into the same old, same old, 5-seater, bulky and heavy car for urban commuting with no passengers. I just can’t wait to buy one to replace my 1994 670 cc three-cylinder Suzuki Alto. It will get me over the hill from Green Island to the city, keep me protected in all inclement weather, store my groceries in the back, and feel safer than riding an electric bike or electric scooter in traffic. Focus should be on this type of approach and technology than on the misdirected same old, same old, driverless cars.

[“Introducing the PEBL: A Vehicle for a Sustainable Future”](https://www.youtube.com/watch?v=Uos7H4ZFA48&spfreload=10)   [Blog](http://www.better.bike/blog/)

**11 July, 2017**

[**World Population Day**](http://www.un.org/en/events/populationday/)

The issue of population growth is the elephant in the room which many people ignore. If we want to address the issue of climate change by reducing our CO2 and equivalent contributions to the atmosphere, then it is the product of the number of people on planet Earth and their individual consumption rates of fossil fuels etc. that impacts on our climate. To ignore population growth will forestall the best of our intentions to address climate change.

In the 1970s my wife and I took the Zero Population Growth cornerstone of sustainability very seriously and we subsequently restricted our family size to two children. We were lucky – we had a daughter and then a son.  Some 40 years later the right to have as many kids as you want in New Zealand is still regarded as being sacrosanct. Even in more enlightened sustainability circles, I have encountered people who have been offended when I point out that one of the most effective ways of reducing our ecological footprint is to restrict the size of our families. For example, see the following publications and YouTube video:

*‘Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming”* edited by Paul Hawken - Amazon.com link [here](https://www.amazon.com/Drawdown-Comprehensive-Proposed-Reverse-Warming/dp/0143130447/ref=sr_1_fkmr0_1?s=books&ie=UTF8&qid=1501711131&sr=1-1-fkmr0&keywords=Drawdown%3A+The+Most+Comprehensive+PLan+Ever+Proposed+to+Reverse+Global+Warming+edited+by+Paul+Hawken)

*‘The Climate Mitigation Gap: Education and Government Recommendations Miss the Most Effective Individual Actions”* by Seth Wynes and Kimberley Nicholas published in the Journal Environmental Research letters 2017 - download link [here](http://iopscience.iop.org/article/10.1088/1748-9326/aa7541)

‘*Sustainability 101: Exponential Growth - Arithmetic, Population and Energy (Full - Updated)”* - Al Bartlett - YouTube link [here](https://www.youtube.com/watch?v=o0ghHia-M54&spfreload=10)

To suggest that all countries, including under developed countries, should restrict population growth by reducing the size of families is regarded as being politically incorrect. Common responses to a call to curb population growth include accusations of right-wing fascist coercion and a knee jerk assumption that the call to curb population growth is based on the politics of eugenics. Along with rights come responsibilities. We all have a responsibility to our current and future generations to leave our planet Earth in a no less worse state than when we were born into it. Education, and not coercion, is the key to families deciding for themselves to restrict the number of children they have. Families in underdeveloped countries need assistance from richer countries to both improve their standard of living, level of education, and to make a transition to a sustainable economy.

**02 August, 2017**

[**Earth Overshoot Day**](http://www.overshootday.org)

Today is Earth Overshoot Day, the day in this year of 2017 when we have already used more from nature than our planet can renew in the whole year. Have a look at France’s Minister of the Ecological Transition addressing his nation on Earth Overshoot Day (YouTube link [here](https://www.youtube.com/watch?v=QRYxpWkcgZ4) with English subtitles). His statement and commitment to addressing Climate Change makes a striking contrast to our own New Zealand Minister for the Environment. Our independent [Parliamentary Commissioner for the Environment](http://www.pce.parliament.nz/), Dr Jan Wright, has issued a rallying call to all Members of all parties in the New Zealand Parliament to come together to tackle climate change. Dr Wright has recommended “... a new Act that is similar to the UK Climate Change Act. This is a law that was passed with overwhelming cross-party support in the House of Commons in 2008. At least nine other countries have since passed similar legislation, including Denmark, Finland, France, Ireland, Mexico, Norway, Scotland, Sweden, and Switzerland.” New Zealand is currently lagging far behind in terms of serious commitment to addressing Climate Change. Dr Wright’s publication “Stepping stones to Paris and beyond: Climate change, progress, and predictability” can be downloaded [here](http://www.pce.parliament.nz/publications/stepping-stones-to-paris-and-beyond-climate-change-progress-and-predictability)

**12 August, 2017**

**An Example of the Folly of Wishful Thinking**

Have a look at the New Zealand Pure Advantage website and its About page - link [here](http://pureadvantage.org)

“About

*Comprised of business leaders who believe the private sector has an important role to play in creating a greener, wealthier New Zealand, Pure Advantage is a not-for-profit that investigates and promotes opportunities for green growth.* Against a gathering storm of population, climate and resource pressures, sustainable living has become an urgent challenge for everyone. There is, however, a silver lining to this cloud – a growing awareness that environmental sustainability and economic growth are not mutually exclusive, and that significant opportunities await those who meet the challenge with speed, creativity and firmness of purpose.”  (My highlighting)

**The First Law of Sustainability**

*Population growth and/or the growth in the rates of consumption of resources CANNOT BE SUSTAINED!*

Economic growth cannot be sustained because growth of the economy (growth in economic activity) cannot be totally decoupled from growth in the consumption of resources.

Have a look at Richard Heinberg’s publication “*There’s No App for That*” which can be downloaded for free from the link [here](http://noapp4that.org)

One of Richard Heinberg’s major conclusions on pages 51 and 52 advocates that the environmental movement should return to first principles in order to become more effective. The Pure Advantage website and its underlying philosophy is an example of why the genuine environmental movement needs to return to First Principles so as to oppose the folly of wishful thinking.

**18 August, 2017**

**New Zealand Minister of Energy & Resources Clanger in Question Time**

I have been following the New Zealand Parliament Question Time for some years now and the following clanger by Judith Collins, Minister of Energy and Resources, in response to questions by Julie Anne Genter, Green Party Member of Parliament has prompted me to save the video and transcript of this 16th August 2017 exchange. The video can be seen on the YouTube link [here](https://www.youtube.com/watch?v=ij2ag9AAtDg)

Judith Collins justified continued oil and gas exploration in New Zealand because “the International Energy Agency forecasts that oil and natural gas will account for almost half of the world’s needs until at least 2040”.  At the end of her questions Julie Anne Genter sought to “leave a table of an analysis that 80% of all existing coal and gas fossil fuels in the ground cannot be burnt.” It is a shame that the format of Question Time does not allow a proper debate which would more clearly demonstrate to the New Zealand public the full extent of Judith Collins’s fallacious justification. If all nations were to burn more than 20% of the current known reserves of fossil fuels, then they would be abrogating their responsibilities to curb greenhouse gas emissions and escalate the extent of climate change. A primary international refereed journal publication that addresses this issue is listed below followed by websites and a 2015 article in The Guardian.

*‘The Geographical distribution of fossil fuels unused when limiting global warming to 2°C”* by Christophe E. McGlade and Paul Ekins, 2015 – ResearchGate link [here](https://www.researchgate.net/publication/270655536_The_Geographical_distribution_of_fossil_fuels_unused_when_limiting_global_warming_to_2C)

*‘Why we need to keep 80% of fossil fuels in the ground”* – 350.org link [here](https://350.org/why-we-need-to-keep-80-percent-of-fossil-fuels-in-the-ground/)

‘*Which fossil fuel reserves must stay in the ground to avoid dangerous climate change?*” – phys.org link [here](https://phys.org/news/2015-01-fossil-fuel-reserves-ground-dangerous.html)

*‘Leave fossil fuels buried to prevent climate change, study urges”* – The Guardian link [here](https://www.theguardian.com/environment/2015/jan/07/much-worlds-fossil-fuel-reserve-must-stay-buried-prevent-climate-change-study-says)

**14 September, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Recommended Documentaries**

Today I decided to track down publications on Risk, Uncertainty, and the Precautionary Principle and also on Discounting and Inter-generational Equity. In doing so I came across the publication "*An Updated Assessment of Oil Market Disruption Risk*" published by the Energy Modeling Forum, Stanford University 2016. The publication is quite sobering. The same information on a blog site might be regarded by some as scaremongering.  The publication can be downloaded [here](https://emf.stanford.edu/search/node/An%20Updated%20Assessment%20of%20Oil%20Market%20Disruption%20Risk) and a summary of the publication can be downloaded [here](https://emf.stanford.edu/publications/emf-sr-10-updated-assessment-oil-market-disruption-risks)

Last night I watched the recorded documentary on TV3 by Bryan Bruce "*Who Owns New Zealand Now?*" This documentary will no doubt eventually find itself onto YouTube. I have come across two other documentaries by Bryan Bruce on YouTube as follows:

*‘Mind the Gap” -* YouTube link [here](https://www.youtube.com/watch?v=__2EdGFdgTA)  and “*Child Poverty in New Zealand”* - YouTube link [here](file:///E:\WYSIWYG%20Web%20Builder%20Output\In%20Search%20of%20Steady%20State\ https:\www.youtube.com\watch?v=rV1-_qhvYC0)

In a similar vein, another documentary, “*Someone Else's Country”* - YouTube link [here](https://www.youtube.com/watch?v=8PISea_Tc4k)

An example of a jaundiced review of the "*Who Owns New Zealand Now?"* documentary has been written by Duncan Greive in the NZ Herald - Link [here](http://www.nzherald.co.nz/entertainment/news/article.cfm?c_id=1501119&objectid=11921349)

**18 September, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Recommended Presentation**

The first 30 minutes or so of the following presentation (59 minutes) is a must see.

*'Clear Price Signals in the NZ ETS”* by Motu: Economic and Public Policy Research - Link [here](http://motu.nz/our-work/environment-and-resources/emission-mitigation/emissions-trading/clear-price-signals-in-the-nz-ets/)

The first 30 minutes or so is presented by [Suzi Kerr](https://motu.nz/about-us/people/suzi-kerr/), Senior Fellow of Motu. I found the content of the first 30 minutes or so to be very informative and well presented. It covers history of where NZ has been, where we are at currently, and where we need to go. Suzi Kerr would be an excellent presenter for our workshop.

The second 30 minutes is a presentation by Catherine Leining on Motu's Emission Treading Scheme for New Zealand. This presentation reinforced for me that a Carbon Tax rather than an ETS is the way to go. An ETS is convoluted and overly complex. A Carbon Tax is straight forward and provides incentives for businesses and private citizens to reduced their direct use and reliance on carbon-based fuels and indirect use of processes and products based on fossil fuels. The revenue collected from the carbon tax would be available by government to invest in solar based energy systems and infrastructure.

If New Zealand is unable to meets its obligations to the Paris Agreement, then it could purchase ETS units from a less developed country which has greater opportunity to reduce its emissions by avoiding a fossil fuel-based infrastructure and upgrading directly to a solar based economy. In other words, the penalties imposed by the Paris Agreement encourages richer countries to assist less developed countries to meet their targets. It is a win-win situation.

**20 September, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Recommended Documentaries**

I have identified 3 very useful YouTube videos on the pros and cons of Carbon Taxes versus Cap and Trade (ETS) which I have now listed on my website under the [video section](file:///E:\WYSIWYG%20Web%20Builder%20Output\In%20Search%20of%20Steady%20State\recommendedvideos-index.html).

In my search for decent presentations on these issues, I found it striking that there was a preponderance of almost troll-like video opposition to carbon taxes. The above videos provide a more balanced review of the pros and cons.

**25 September, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Blog on Denial**

I am also very disappointed about the election results and I am in a process of regrouping and pondering what is the best action of response one can undertake. I keep coming back to education and the need to combat deliberate misinformation.

Thanks for passing on the links. Much appreciated. I am most impressed by the first link that I am currently processing - namely Rob Mielcarski’s *“Un-Denial” Blog* - Link [here](https://un-denial.com)

**6 September, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Recommended Book**

I recommend the book “*Denial: Self-Deception, False Beliefs, and the Origins of the Human Mind”* by Ajit Varki and Danny Brower, 2014 - Amazon.com link [here](https://www.amazon.com/Denial-Self-Deception-False-Beliefs-Origins/dp/1455511919/) The Kindle version costs US $10.34

**10 January, 2019**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Recommended Websites**

If you don't already subscribe to *Climate Reality Project*, then the following links provide positive messages you might be interested in:

*‘How to talk about climate change - according to the science”* - Link [here](https://www.climaterealityproject.org/blog/how-talk-your-friends-about-climate-crisis-according-science)

*‘Got #ClimateHope? Ninety-nine reasons to keep fighting for our future”* - Link [here](https://www.climaterealityproject.org/blog/got-climatehope-ninety-nine-reasons-keep-fighting-our-future)

**05 October, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Recommended Documentary**

The following YouTube video might be of interest to you:

*'Threat to the Planet Implications for Intergenerational Justice and Energy Policies”* - UC Berkeley Events 13 February 2009 - James Hansen: Director, NASA Goddard Institute for Space Studies - YouTube link [here](https://www.youtube.com/watch?v=h4ctTxZHosI&pbjreload=10)

**11 October, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN)**

I have come across the following Open Access Publisher website you might find to be of value:

*Intech: World’s largest Science, Technology & Medicine Open Access book publisher* - Link [here](https://www.intechopen.com)

I have just downloaded a book chapter by chapter in PDF format on Glacier Research.

**16 October, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN)**

Last week I spent some time hunting down information on what some people overseas call "City Prepping" - preparing for survival in a city in times of emergency. The following YouTube series might be of interest to you:

*“City Prepping: Helping City Dwellers Learn the Basics of Survival in Times of Crisis”* - YouTube link [here](https://www.youtube.com/channel/UCmb2QRAjdnkse21CtxAQ-cA)

In the above series or possibly another YouTube video, I came across what is called a Rocket Stove which is ideal for cooking and boiling water. An Internet search of its availability in New Zealand came up with a supplier on TradeMe as follows:

[Challenge Yachts Ltd](https://challengeyachts.com) $227.82 plus $21.85 courier to Dunedin. I have made my purchase.

The above exercise prompted me to also buy a 250-litre water tank from Bunnings for $215 complete with water collector/diverter from roof and 1 metre hose and fittings even though I have at hand three 10 litre water containers and a water tank system in my roof space. The cost per litre of storage of the Bunnings water tank is a bargain and the water tank is easily connected to a downpipe. We all need a minimum of 2 litres of drinking water per day, so 250 litres will do the job for a few months between rainfall. I will immediately fill my tank with tap water.

**17 October, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Wise Response**

Thanks for the Wise Response submission. The contents of a large part of the submission look familiar and I have at hand many of the cited publications and similar publications.

I signed the Wise Response petition some time ago. After reading the final submission I am pleased to find that it echoes very closely my own sentiments and conclusions. Clauses which struck a special chord for me in terms of needed action and change were #165, #178, #181, #193, and #194.

I have joined Wise Response as a member. Membership is free which is not always the case. Some time ago I came across a New Zealand research organisation which required a hefty annual membership fee. My gut feelings were that the organisation was pandering to vanity membership rather than genuinely trying to bring about change. On my own website I have avoided links to other websites which have the prime purpose of generating income (apart from Amazon.com links for recommended books). We all need to pull together and provide our services for free.

**17 October, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Drivers of CO2 Emissions**

Thank you for the link. Much appreciated. Robbie Andrew has done some very interesting work on climate change. I see that his research profile is on the University of Oslo website and yet he works for CICERO, Center for International Climate Research, which is an institute based in Norway. This institute seems to be independent of the University of Oslo, so perhaps Robbie Andrew is a part-time or honorary lecturer at the University of Oslo. Tomorrow I will add Robbie Andrew to my list of researchers on my website and CICERO to my list of global research organisations.

There is certainly no dearth of information over the Internet. So far, I have collected far more information than I can possibly process, but I am still adding links to websites that I find to be especially interesting and informative which others may be able to make better use of than I can.

I think my days of doing original research are over. It involves too much brain strain and requires too much specialisation for my taste in order to add to the pool of knowledge.

My current role, if any, is to focus on educating the general public by way of e-learning courses and educational video. This also involves brain strain. Developing the *Climate Reality Project* video was a breeze to do with a readymade script and slides at hand. As an aside, I note that the Wise Response submission refers to the need for life cycle costing. I have a Cost in Use / Annual Equivalent Calculator for download on my website.

Creating good visual slides is time consuming. In the last few weeks, I have been processing such slides into a common 1920 x 1080 pixel format with permission to do so by the creators of a number of PowerPoint presentations. Most of these presentation slides are a visual overload. Simplification is sorely needed. The advantage of using the software Camtasia Studio is that I can zoom in on sections of slides and highlight points of interest. With Articulate Storyline I can structure an e-learning course so that a viewer can navigate at their own pace. With Camtasia Studio, even a movie over the Internet can be navigated by a viewer at their own pace. This is not possible with a YouTube movie, hence why I have my own website instead of using WordPress or relying on YouTube.

**20 October, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Recommended Books**

Great news on the formation of a Labour, NZ First, NZ Green Party Coalition Government. I have logged the global response on my website in the [Global News](file:///E:\WYSIWYG%20Web%20Builder%20Output\In%20Search%20of%20Steady%20State\news-index.html) section which includes NZ Herald's Headline from Mike Hosking. At long last we can make progress on climate change action at government level.

My website includes recommended books on Transition in the [Recommended Books](file:///E:\WYSIWYG%20Web%20Builder%20Output\In%20Search%20of%20Steady%20State\recommendedbooks-index.html) section. The best book that I have come across on Transition is

"*Earth at a Crossroads: Paths to a Sustainable Future*" by Hartmut Bossel, 1998 - Amazon.com link [here](https://www.amazon.com/Earth-Crossroads-Paths-Sustainable-Future/dp/0521639956)

Unlike many authors of popular books on the subject who findings are based on an amalgam of other people's primary and far too frequently secondary research, Emeritus Professor Hartmut Bossel is a scientist and researcher in systems dynamics which is key to combining all issues of sustainability. The book is a delight to read. I own four of his more technical books which I also rank as being among the best written on systems dynamics.

Too many books on transition are overly optimistic as to what is possible and overlook the scale and time required for transition. When these factors are taken into consideration, I finish up being an optimistic pessimist hence why I feel the need for long term City Prepping. If one of a number of serious worst case scenarios should occur here in Dunedin - for example a long and protracted disruption to our supply of petrol - then I am sure that long term City Prepping will see us through. However, the most serious long-term City Prepping issue is that of ensuring food supplies. That is why Community Gardens are so important.

**22 October, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Solar Powered Laptop, Mobile etc.**

With regards to City Prepping for long term disruptions to our petrol, water, and electricity supply:

1. Shelter is taken care of - we keep living at home as usual.

2. Potable water is taken care of - a 250 litre tank ($145 from Bunnings) per person replenished by downpipe diverter from spouting ($30 plus additional piping).

3. Cooking is taken care of - Rocket Stove ($250 from TradeMe) and Dutch Oven ($30 from TradeMe).

4. Heating is taken care if one has a wood burner and a stock pile of timber. I have a wood burner in my lounge. My lounge ceiling is triple insulated and I have single insulation underfloor. The windows of my lounge are insulated in winter with polystyrene slabs ($60). I heat only one room at a time - the room I am in. Warm clothing is a sensible way to keep warm in winter at low cost. In winter I wear thermals, trail pants under my jeans, and two jerseys. If one doesn't have a wood burner, then a good investment for winter in Dunedin would be insulated trousers and overcoat.

5. Food in the medium term (2 months) is taken care of by stock piling what you normally use. Food supply is a problem in the long term if you don't already have a large veggie garden. This is where Community Gardens come in.

6. Transport is taken care of if you have a bicycle and are able to ride it.

As I have said before, it is possible to cope living in the city should there be a long-term disruption to the supply of petrol, water, and electricity. It is a sufficient supply of food that is the main problem.

During a long-term disruption to the supply of electricity, I want to continue using my tablet and laptop and to be able to recharge my mobile phone and emergency portable LED lights. This is where solar power comes in. I have purchased the [Power ADD Universal Solar Laptop Charger](https://www.trademe.co.nz/mobile-phones/accessories/chargers/solar-chargers/auction-1447231008.htm)  from TradeMe ($131 delivered to Dunedin):

The device can recharge a mobile a number of times without becoming fully discharged. According to reviews, the device cannot recharge itself from solar if its charge goes below 50%. If this is the case and a 100% recharge of my laptop takes the charge level of the device below 50%, then I will invest in an additional 100-watt 19-Volt solar panel (about 1 square metre) to recharge the device. The additional PV will cost about $300. It is possible to run our computers on solar energy at a moderate low cost.

The cost of PVs has come down to about 10% of the cost 10 years ago, but solar storage batteries are still very expensive. A much better way of storing solar energy is to use our current hydro lakes. Solar energy from PVs during the day can be fed back into the grid for use by electrified transport systems and industry thus saving release of water through the hydro turbines. Even though PVs have come down in cost, I suspect that most families in New Zealand would still baulk at buying a low end 3.5 KW system which feeds back into the grid. This is where a carbon tax would help. The government could return collected carbon taxes to taxpayers by way of subsidies for the specific purpose of purchasing solar collectors or investment in other methods of reducing our carbon footprint and reliance on fossil fuels (electric bikes, group electric cars etc). Targeting return of carbon taxes towards climate change action investments would be more effective than simply returning carbon taxes to taxpayers for subsequent discretionary spending. Investment by taxpayers in targeted investments would result in savings for each taxpayer - lower home electricity and transport costs. Taxpayers who do not have PVs which feed back into the grid would pay a higher charge for electricity.

**23 October, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Recommended Movie**

If you missed the *"Death by Design"* movie on computer manufacturing and pollution screened on Aljazeera last night, then you will be able to view the movie over the Internet - Link [here](http://www.aljazeera.com/Search/?q=Death%20by%20Design)  A description of the movie is as follows:

"Consumers love - and live on - their smartphones, tablets and laptops. A cascade of new devices pours endlessly into the market, promising even better communication, non-stop entertainment and instant information. The numbers are staggering.

The cell and smartphone industries have saturated the market; in 2015, it was estimated that 98 percent of all US citizens aged between 18 - 29 years owned a mobile phone. A staggering 86 percent owned smartphones. By 2020, four billion people will have a personal computer. Five billion will own a mobile phone.

But this revolution has a dark side, hidden from most consumers.

In an investigation that spans the globe, filmmaker Sue Williams investigates the underbelly of the electronics industry. What was uncovered tells an entirely different story to the falsified "clean industry" reputation promoted by the global electronics industry and the semi-conductor industry.

Even the smallest devices can have deadly environmental and health costs that are not only immediate but can span generations of workers who are still suffering the effects of a band-aid culture.

From the intensely secretive factories in China, to a ravaged New York community and the hi-tech corridors of Silicon Valley, the film tells a story of environmental degradation, of health tragedies, and the fast-approaching tipping point between consumerism and sustainability."

**23 October, 2017**

**At Long Last an Opportunity for a Carbon Tax in New Zealand**

On 23 September 2017 New Zealand held its three-year term election and in the last few days the Labour Party, NZ First, and the NZ Green Party have been forming a new government. This is good news for current and future New Zealand citizens because the previous National Party government for 9 years has continually blocked and delayed action on Climate Change (see [NZ News](file:///E:\WYSIWYG%20Web%20Builder%20Output\In%20Search%20of%20Steady%20State\news-media.html) section on this website). At long last we have an opportunity to make progress on climate change action at government level.

In the [Video section](file:///E:\WYSIWYG%20Web%20Builder%20Output\In%20Search%20of%20Steady%20State\recommendedvideos-index.html) on this website I have identified three YouTube videos on the pros and cons of Carbon Taxes versus Cap and Trade (Emissions Trading Scheme ETS). After reading a number of publications on Carbon Tax and Cap and Trade (see below), these videos have reinforced for me that a Carbon Tax rather than an ETS is the way to go. An ETS is convoluted and overly complex whereas a Carbon Tax is straight forward and provides incentives for businesses and private citizens to reduce their direct and indirect use and reliance on carbon-based fuels. The revenue collected from a carbon tax would be available by government to invest in sustainable energy systems and infrastructure and/or return to taxpayers.

The cost of solar collector PV panels has come down to about 10% of the cost 10 years ago, though solar storage batteries necessary for going off the grid are still very expensive. A much better way of storing solar energy for those close to the grid is to use our current hydro lakes for storage. Solar energy from PVs during the day can be fed back into the grid for use by electrified transport systems and industry thus reducing release of water through the hydro turbines.

Even though PVs have come down in cost, I suspect that most families in New Zealand would currently still baulk at buying even a low end 3.5 KW system which feeds back into the grid. This is where a carbon tax would help. The government could return collected carbon taxes to taxpayers by way of subsidies for the specific purpose of purchasing solar collectors or investment in other methods of reducing our carbon footprint and reliance on fossil fuels (electric bikes, group electric cars etc.). Targeting return of carbon taxes towards climate change action investments would be more effective than simply returning carbon taxes to taxpayers for subsequent discretionary spending. Investment by taxpayers in targeted investments would result in savings for each taxpayer - lower home electricity and transport costs. Taxpayers who do not have PVs which feed back into the grid would pay a higher charge for electricity.

**Publications on taxation**

*‘Economics of the Public Sector”* by Joseph Stiglitz and Jay Rosengard, 2015 4th Edition - Amazon.com link [here](https://www.amazon.com/Economics-Public-Sector-Fourth-Stiglitz/dp/0393925226/ref=sr_1_1?s=books&ie=UTF8&qid=1508691947&sr=1-1&keywords=%E2%80%98Economics+of+the+Public+Sector%E2%80%99+by+Joseph+Stiglitz)

*‘Ecotaxation”* edited by Timothy O’Riordan, 1997 - Amazon.com link [here](https://www.amazon.com/Ecotaxation-Timothy-ORiordan/dp/1853832634/ref=sr_1_fkmr0_1?s=books&ie=UTF8&qid=1508692694&sr=1-1-fkmr0&keywords=%E2%80%98Ecotaxation%E2%80%99+edited+by+Timothy+O%E2%80%99Riordan)

*‘Environmental and Natural Resources Economics”* by Tom Tietenberg, 9th Edition 2014 - Amazon.com link [here](https://www.amazon.com/Environmental-Natural-Resources-Economics-Tietenberg/dp/0131392573/ref=sr_1_1?s=books&ie=UTF8&qid=1493852386&sr=1-1&keywords=%E2%80%98Environmental+and+Natural+Resources+Economics%E2%80%99+by+Tom+Tietenberg%2C)

‘Environmental Economics: In Theory and Practice” by Nick Hanley, Jason Shogren and Ben White, 2006 2nd Edition - Amazon.com link [here](https://www.amazon.com/Environmental-Economics-Practice-Nick-Hanley/dp/033397137X/ref=sr_1_1?s=books&ie=UTF8&qid=1508693034&sr=1-1&keywords=%E2%80%98Environmental+Economics%3A+In+Theory+and+Practice%E2%80%99+by+Nick+Hanley%2C+Jason+Shogren+and+Ben+White)

‘*Public Finance And Public Choice: Analytical Perspectives* “ by John Cullis and Philip Jones, 2009 3rd Edition - Amazon.com link [here](https://www.amazon.com/Public-Finance-Choice-Analytical-Perspectives/dp/0199234787/ref=sr_1_1?s=books&ie=UTF8&qid=1508692218&sr=1-1&keywords=%E2%80%98Public+Finance+And+Public+Choice%E2%80%99+by+John+Cullis+and+Philip+Jones%2C)

*‘Public Sector Economics: Theory, Policy and Practice”* by Stephen Bailey, 2001 2nd Edition - Amazon.com link [here](https://www.amazon.com/Public-Sector-Economics-Theory-Practice/dp/0333929535/ref=sr_1_1?s=books&ie=UTF8&qid=1508692458&sr=1-1&keywords=%E2%80%98Public+Sector+Economics%3A+Theory%2C+Policy+and+Practice%E2%80%99+by+Stephen+Bailey)

**New Zealand Specific Publications:**

*‘An Effective NZ ETS Clear Price Signals to Guide Low-Emission Investment”* by Motu Economic and Public Research 2016 - Download link [here](https://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjur-iV5oTXAhXBmZQKHandDRcQFgglMAA&url=https%3A%2F%2Fmotu.nz%2Fassets%2FUploads%2FAn-Effective-NZ-ETS-Clear-Price-Signals-.pdf&usg=AOvVaw0sjV7jwivfcrKJ1I6cbLD7)

*'Energy Policies of IEA Countries: New Zealand 2010 Review”* by International Energy Agency, 2010 - Download link [here](https://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjt7vv754TXAhUBUZQKHegqDeQQFgglMAA&url=https%3A%2F%2Fwww.iea.org%2Fpublications%2Ffreepublications%2Fpublication%2FNewZealand2010.pdf&usg=AOvVaw1VOgb6xcRtUJWkCiwQ_ADV)

*'Energy Policies of IEA Countries: New Zealand 2017 Review”* by International Energy Agency, 2017 - Download link [here](https://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0ahUKEwivnM3i54TXAhXIJpQKHWIRAqIQFggsMAE&url=https%3A%2F%2Fwww.iea.org%2Fpublications%2Ffreepublications%2Fpublication%2FEnergyPoliciesofIEACountriesNewZealand2017.pdf&usg=AOvVaw1RQ4fQeroJVsRDO0v5TIaf)

*'Low-emissions Economy”* by New Zealand Productivity Commission, 2017 - Download link [here](http://www.productivity.govt.nz/sites/default/files/Low%20emissions%20economy%20issues%20paper%20FINAL%20WEB.pdf)

*'The Carbon Challenge: Response, Responsibility, and the Emissions Trading Scheme”* by Geoff Bertram and Simon Terry, 2008 - Download link [here](http://www.geoffbertram.com/fileadmin/publications/The_Carbon_Challenge_complete.pdf)

*‘Transition to a Low-Carbon Economy for New Zealand”* - The Royal Society of New Zealand, 2016 - Download link [here](https://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjC9Li244TXAhWLKJQKHTnVCCoQFgglMAA&url=https%3A%2F%2Froyalsociety.org.nz%2Fassets%2Fdocuments%2FReport-Transition-to-Low-Carbon-Economy-for-NZ.pdf&usg=AOvVaw2tWiSOE48Olvep4Sj5EiOe)

**Overseas Specific Publications**

*'Zero Carbon Britain 2030: A New Energy Strategy. The Second Report of the Zero Carbon Britain Project”* by Centre for Alternative Technology, 2010 - Download link [here](https://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjD28_T6oTXAhUClJQKHfpxD4QQFgglMAA&url=http%3A%2F%2Fb.3cdn.net%2Fnefoundation%2F7e8212826db20c2c3f_qcqm67257.pdf&usg=AOvVaw29r-CXFF24Gk69GOo-_t1w)

**10 November, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - City Prepping Continued**

My Power ADD Universal Solar Laptop Charger from TradeMe ($131 delivered to Dunedin) does take a long time to charge using its small inbuilt PV panel. I have therefore purchased a 100-watt PV panel from TradeMe for $160 delivered to make the system more practical. I have connected the PV panel directly into my Power ADD using an additional connection cable purchased from Amazon.com for $21 delivered. I first replaced and soldered the end plug for $2 to match the Power ADD.  My laptop runs at 85 watts so, in theory, it is possible to plug my PV directly into my laptop. However, it is safer to charge up the Power ADD first because it has inbuilt safety features and then use the Power ADD to recharge the laptop.

I have tested out how long it takes to boil water using my Rocket Stove. When the fire is up and running it takes 8 minutes to boil 1.5 litres of water in my cast iron Dutch Oven which has a cast iron lid. It takes 4 minutes to boil 0.5 litres of water in a cold cast iron skillet and 3 minutes when the skillet has already been heated.

It is not a good idea to boil water in cast iron containers because doing so removes the vegetable oil baked on patina which protects against rusting. That is why I have purchased a 1.6 stainless steel litre [Kelly Kettle](https://www.kellykettle.com) from the UK for NZ $127 delivered. This kettle works on the same principle as the New Zealand manufactured Thermette Kettle which sells for more or less the same price delivered, except the Kelly Kettle is a better-quality constructed kettle. The copper Thermette Kettle is very expensive. All these kettles are far more efficient at boiling water than boiling water over a fire in a container. I expect to be able to boil 1.6 litres of water in my Kelly Kettle within a few minutes.

For those who live on a gluten free diet and accordingly make their own bread, the following is not new to you. The food which contains the most carbohydrates and nutrition in the smallest volume of space and which have the longest shelf life are the grains before milling and rice. Brown rice can go rancid after 6 months, whereas white rice has a shelf life of a few years when stored in airtight containers. Wheat grain lasts for years in appropriate storage.

With regards to long term City Prepping food storage, a grain and rice mill grinder is essential. I have purchased a genuine [Victoria Corn Mill](https://www.haurakihomebrew.co.nz/grain-mills/2167-victoria-corona-grain-and-cereal-mill.html) made in Corona - not an inferior imitation - for NZ $123 delivered.

I have tested out milling 3 cups of brown rice (a typical number of cups of flour to bake a loaf of bread) and I have boiled the results mixed with water in my microwave. It takes two minutes to mill 3 cups of rice at the resistance setting that I feel comfortable with. Each successive milling of the same cups of rice by screwing the face plates closer together takes about 2 minutes at the same resistance and the number of times that one needs to mill the same cups of rice depends on whether you want to boil the rice as a breakfast food or desert or for baking scones and bread. To get the consistency of flour for baking a loaf of brown rice bread would require me to do 4 cycles of milling.  Doing only one milling and boiling in water to an acceptable level requires 10 minutes in my microwave and using two cycles of milling requires only 5 minutes of boiling. The above experiment demonstrates and confirms for me that my Victoria Corn Mill is a practical way to enable use of long shelf-life grains and rice. It is possible to use a battery powered drill to do the milling for you. My Power ADD can recharge 12-volt, 16-volt, and 19-volt batteries. I am not going to bother doing that as it is so easy to mill 3 cups of grains or rice.

My recent Internet search for bulk purchase of pre-milled grains demonstrated to me that buying from a health shop is an expensive option. If one doesn't shop around, then one will finish up paying for example many times more for wheat grain than milled flour. The same grains that are milled for purchase in the supermarkets are also used as animal feedstock. One can buy pre-milled grains in bulk at a reasonable price by making a visit to a number of mills in Ashburton or by talking to someone you know who has horses or pigs to find out their local source of feedstock or source which is prepared to deliver from another centre.

**11 November, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - City Prepping Continued**

I am currently a novice when it comes to City Prepping, but I am motivated to learn much more and I will be carrying out experiments in baking bread and scones in a Dutch oven and pikelets in a skillet over my Rocket Stove using grain and rice that I mill. I have seen a reference to sprouting grains and I will look into this.

City Prepping is taking a survivalist stance to the future and to some people this is an extreme and pessimistic stance. I am not so sure this is the case. I think that City Prepping is tied up with resilience. We are currently locked into a just-in-time supply chain system of food production and distribution. This type of system is risky. We need to plan and organise by the seasons when it comes to food. Bottling fruit and jam may be considered by some to be old fashioned when we can buy the same products in the supermarket, but this activity is sensible. When our civilisation shifted from being hunter-gatherers to being an agricultural society, long term storage of food was a necessary component and activity. In the future we will all need to live by the seasons again and plan accordingly. Food supply will need to be planned at a community level by an annual basis and not by a weekly expedition to the supermarket to replenish food supplies that have been totally consumed over the previous week.

**12 November, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Grain Sprouting & Rice Flour Bread**

The following links should provide all the necessary information one needs to know about sprouting grains:

[Mother Earth News website](https://www.motherearthnews.com/real-food/essene-bread-sprouted-grain)     [Nourished Kitchen website](http://nourishedkitchen.com/how-to-make-sprouted-grain-flour/)   [Bread Experience website](https://www.breadexperience.com/sprouted-bread/)   [YouTube Video](https://www.youtube.com/watch?v=V_qyNNbFqaY)

After reading and viewing the above web pages and YouTube video, I am keen to try out some sprouting, but first I need to purchase some wheat grain at a reasonable bulk price. I have bags of white and wholemeal flour at hand which will store for 6 months, but as yet no wheat grain which can store for years.

I have come across a large number of brown rice flour recipes which include starch-based flour, but I haven't been able to find any recipe that uses only brown rice flour. I therefore carried out an experiment yesterday to find out if it was possible to bake bread using only brown rice flour. I used the same bread recipe that I have used for years in my Panasonic bread maker and substituted milled white and wholemeal flour with brown rice flour. The "dough" didn't rise even though I had used yeast and the mixture looked like porridge just before baking. The end result was edible, but not palatable - the "bread" was too heavy and dry.

This morning I did an Internet search to establish the cause of the failure of my experiment and I came across the answer in a [scientific journal article](https://www.sciencedaily.com/releases/2017/03/170322092653.htm) - brown rice or white rice flour alone simply cannot make dough. The article continues to describe that a new method of wet milling overcomes the inability of dry milling of rice flour to form dough. At this stage I do not know whether it is possible to duplicate wet milling at home.

On another website I found out that one can make tortillas on a skillet using only rice flour and water. For the time being I have flagged away making brown rice flour bread and scones because the necessary ingredients to do so include starched flour. It is far easier for me to mill my own wheat grain flour and use simple recipes which include making my own yeast.

My next experiment will involve baking bread in a cast iron Dutch oven on top of my electric stove. I have ordered an oven thermometer for $7.60 delivered and a Probe thermometer for $13.84 delivered from TradeMe. It is sensible to establish the ideal temperatures and time to bake bread in a Dutch oven on top of an electric stove first under controlled conditions before finding out how to set up the same conditions on a Rocket Stove. Maintaining a suitable hot flame in the Rocket Stove for up to an hour will in itself be a learning experience.

Under emergency conditions with the power down, breakfast is taken care of - first boil water in my Kelly Kettle and pour on my porridge and stir in a pot on my Rocket Stove. Lunch is taken care of by making brown rice tortillas or wheat grain flour-based pikelets on a skillet over my Rocket Stove. I normally toast slices of my homemade bread for lunch. In due course I will learn how to bake bread and scones in a Dutch oven on top of my Rocket Stove. For dinner - well, that is straight forward cooking in a cast iron skillet or Dutch oven over my Rocket Stove using baked beans and vegetables at hand and whatever else I have stored away. As an aside, tinned fish is half the price of tinned meat.

I like having desert at night, so I have a choice of cooking rice, sago, tapioca, and semolina. Tinned fruit helps with variety. The advice I get from City Prepping websites is to also stock up with non-essential food items to ensure variety in diet - jams, dried fruit, Marmite which I like, etc. etc. A supply of salt is essential. Don't forget vegetable oil.

**13 November, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Bread Recipes & Pizza Oven**

There is a lot for me learn about different bread recipes. I have used only one recipe so far in my Panasonic bread maker with a bit of tweaking. The basic ingredients are 2 cups of white flour, one cup of wholemeal flour, 3 teaspoons of Edmonds Surebake Active Yeast Mixture, one teaspoon of salt, 3 tablespoons of milk powder, and 3 tablespoons of Pams Salad & Cooking Oil. My personal tweaking is 5 grams of Thyme and 6 tablespoons of split pea and lentil mix.

For baking in a Dutch oven, I will be going for a simple recipe using the minimal number of ingredients - self milled flour, water, salt, and yeast. I like the idea of making one's own yeast. I have downloaded a number of simple recipes from YouTube. One recipe uses near boiling water to shorten the time before actual baking.

Sprouting is totally new to me and I like the idea of using long term storage peas, beans, and mung beans to make salad greens.

I don't think I will ever get around to building my own pizza oven. I can see the advantages of a community oven for baking bread and pizzas. It would be more efficient on fuel to bake many loaves of bread in one firing of a community oven. Use of a Dutch oven for baking bread etc. would be more efficient for baking at small scale for a single family. Another advantage of a Rocket Stove/Dutch oven combination is that it is portable. The total weight is 15 kilograms.

I will wait for the arrival of my oven thermometer and probe thermometer before trying out simple bread recipes in Dutch oven on my stove top element first and then my Rocket Stove.

Before I forget, I have already checked out Harraways website for purchase of pre-milled oat grains. Yes, you can so long as you purchase in bulk by the tonne. A few weeks ago, I spoke to a staff member at Moana Pool who works in the Harraways office and I queried him about buying processed porridge in bulk direct from Harraways. His reply was the company was considering it, but that option was not available at the moment.

**23 November, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Trump’s Toxic War Video**

Have a look at the following video released by Aljazeera on 22 November 2017:

*'The Rollback: Trump's Toxic War***”** - A look at the Trump administration's regulations cull and the consequences for health, safety and the environment - Aljazeera link [here](http://www.aljazeera.com/programmes/faultlines/2017/11/rollback-trump-toxic-war-171120210101895.html)

**26 November, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) – Handmills**

I paid $123 delivered for my [Victoria hand mill](https://www.haurakihomebrew.co.nz/grain-mills/2167-victoria-corona-grain-and-cereal-mill.html). I hand milled 3 cups of whole wheat grain to a flour (5 cycles at a reasonable resistance) and it took me 12 minutes. It is certainly a workout. It is possible to remove the handle and attach an electric drill to do the work for you. All that is involved is buying a bolt with the same thread as the wing nut used to hold the handle in place and cutting off the head of the bolt, screwing the result into the shaft of the hand mill, and attaching the electric drill to the end. A jig or clamp could be set up to support and hold the electric drill in place. I might try out my electric drill sometime.

Three cups of whole wheat grain mill out into 4 cups of 100% wholemeal flour. I used 3 cups of this 100% wholemeal flour in my usual bread recipe and baked a loaf of bread in my Panasonic bread maker. The dough didn't rise very much, but the resulting bread had some spring to it and was very tasty. Next time around I will use my flour sieve to increase the proportion of white flour (increase the gluten content). The dough will then rise much more.

I tried baking scones in a cast iron Dutch oven with a dome shaped lid all on top of the element of my electric stove. I followed a YouTube video tip and placed the Dutch oven on top of a cast iron skillet so as to avoid burning the bottom of the scones. The result was a failure. The bottoms of the "scones" were well and truly burnt and the top was under baked.  Advice over the Internet was to use a Dutch oven with a flat lid and ridge and to place hot embers on top of the lid so as to increase the inside temperature at the top of the Dutch oven.

I ordered such a Dutch oven, but before it was delivered, I decided that control of the temperature would still be hairy and I didn't want to get into using an open camp fire approach which defeats the purpose and advantage of using a Rocket stove. I came across what is called a Coleman oven on YouTube. A number of YouTube videos show a Coleman oven in operation on top of a Rocket stove. These videos persuaded me that a [Coleman oven](http://www.equipoutdoors.co.nz) was a far better approach than using a Dutch oven for baking and I ordered one for $116 delivered.

On Friday I tested out the combination of the Coleman oven on top of the Rocket stove. I followed a YouTube tip and placed two bricks inside the bottom of the oven. The Coleman oven heated up to 230 C within 20 minutes of firing up the rocket stove and I cooked my Friday night pizza in the oven. I kept the oven going for one hour to see if I could maintain a stable temperature. The Coleman oven has a thermometer built into the front door and I used an additional probing thermometer placed in the vent at the top of the oven. The temperatures remained stable over one hour and it didn't take much additional firewood to maintain the temperatures.

The Coleman oven can collapse into a 300 mm x 300 mm x 75 mm using a very elegant concertina design. However, the Coleman oven isn't designed to lift and carry two bricks on the bottom of the oven using the handle at the top of the oven. Yesterday I pop riveted the sides of the oven together into a permanent cube configuration. An excellent result.

My next experiment is to bake scones in my Coleman oven. I will then try baking bread in my Coleman oven after testing out a suitable bread recipe using hand milled flour in my Panasonic bread maker. I haven't yet got into sprouting grains or making my own rising mixture.

**27 November, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - City Prepping at a Community Level**

In the following I am tossing out a few ideas. Within the context of City Prepping and recent comments to me about the possible need for a community grain mill and baking oven has set me thinking. A number of months ago I came across a website called [Open Source Ecology](http://opensourceecology.org) which I added to my website with the following quote:

“The mission of Open Source Ecology (OSE) is to create the open source economy. An open source, libre economy is an efficient economy which increases innovation by open collaboration. To get there, OSE is currently developing a set of open source blueprints for the Global Village Construction Set (GVCS) – a set of the 50 most important machines that it takes for modern life to exist – everything from a tractor, to an oven, to a circuit maker. In the process of creating the GVCS, OSE intends to develop a modular, scalable platform for documenting and developing open source, libre hardware – including blueprints for both physical artefacts and for related open enterprises.”

In recent weeks I have focused on City Prepping at a personal level. The above website is essentially about City Prepping for technology at a community level. City Prepping could be regarded as a survivalist approach based on extreme pessimism. I am not so sure. I put forward that City Prepping is about preparing for a future that society is able to have in the long term as opposed to a society that we would desire to have. Preparation includes planning for contingencies and building in resilience

Sustained growth of any form is simply impossible. A vision of a society that we are able to have in the long term must therefore be based on the attributes of a steady state settlement as opposed to that of a growth settlement. In my 1978 sub-thesis *"In Search of Steady State"* I developed such a summary and my 1979 journal article on sustainable future planning (attached) is based on this summary. Hartmut Bossel in his 1998 book *"Earth at a Crossroads: Paths to a Sustainable Future"* has adopted a similar approach to sustainable future planning and advocates that we must plan for a sustainable future that we are able to have rather than continue on our current path. Hartmut Bossel makes the following comment on page 28.

"This final step of the systems-analytical research led to an important conclusion:

The many alternative visions of sustainable futures that have been published in the past three decades all agree - with minor variations - on the fundamental principles and processes of Future Path B “Partnership'

This is a remarkable result, and it is all the more remarkable as the different authors have arrived at these alternative visions independently of each other - in different countries, at different times, under different circumstances, in different languages. It can only mean that there is a common body of facts, knowledge, and ethical principles from which consistently the same conclusions can be drawn. "

The website *"Open Source Ecology"* merits closer examination. The About page continues as follows:

"The current practical implementation of the GVCS is a life size LEGO set of powerful, self-replicating production tools for distributed production. The Set includes fabrication and automated machines that make other machines. Through the GVCS, OSE intends to build not individual machines – but machine construction systems that can be used to build any machine whatsoever. Because new machines can be built from existing machines, the GVCS is intended to be a kernel for building infrastructures of modern civilization."

There are many links from the Wikipedia type structure of the above website to other websites on technology. One surprising (to me) link is to a [YouTube video](https://www.youtube.com/watch?time_continue=151&v=Z3Z003uBn9Q) on how to have a hot shower in winter using the heat from a compost heap:

In a more serious vein, City Prepping for community-based technology begs the following question - within the context of fossil fuels no longer being available for use in transport, to what extent is Dunedin and its surrounding farmland self-contained in terms of essential and necessary technology in order to avoid this community from eventually declining into a hunter and gatherer society? Do we have sufficient machines in Dunedin to make machines and maintain machines or are we totally reliant on other communities to provide this? If so, then what type of transport linkages between communities are needed and what type of transport technology is possible in the long term. I keep coming back to the need to electrify our national railway network between major centres otherwise each major community will need to be totally self-supporting. Some of the risks that we face over the next number of decades is malinvestment in infrastructure and development. Investments need to stack up against the attributes of steady state settlements and not growth settlements. There are strong arguments that electric trucks are not the answer. Electric trains are a proven technology whereas electric trucks are not, and this does not take into account whether we will be able to maintain our roadways which are currently dependent on the availability of asphalt, a fossil fuel by-product.

**01 December, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Grain Mill & Electric Drill**

I have tried out my variable speed electric drill on my Victoria Grain Mill and it is so much easier than hand milling.

A few weeks ago, I milled brown rice to a flour (it took 5 cycles of milling) and made some tortillas in my cast iron skillet on top of my electric stove. This was very successful. I have since learned that a tortilla press makes the process much easier than using a rolling pin, though two flat boards squeezed together with baking paper on both side of the tortilla mix will do the same job. Yesterday I tried to boil the rice flour to see what sort of desert would turn out. The taste of the result was OK but the texture was too much like paste.

Today I bought a pack of 4 nuts and bolts from Mitre 10 and cut the head off one of the bolts. I poured 3 cups of brown rice into the hopper of the mill (it can take 4 cups and possibly 5 cups) and I adjusted the resistance so that I could hand mill with ease. I didn't want the resistance to be too tight because I would risk burning out the motor of my drill and I would risk injuring my wrist when holding the electric drill still (I didn't use a jig). I then removed the handle of the mill and screwed the cut bolt into the end of the hand mill and attached my electric drill set to the lowest speed. It took possibly 10 second to mill 3 cups of brown rice. I poured the contents back into the hopper, screwed the milling plates closer together making sure the resistance against milling was too much, and then I did a second cycle of milling. All finished within one minute.

I poured boiling water over half a cup of two cycle milled brown rice in a Pyrex bowl, stirred thoroughly, and put in my microwave on full for 5 minutes. I then added some more hot water, stirred, and cooked in my microwave for another 5 minutes. The result was a nice rice pudding with good texture. There is a balance between the number of cycles of milling, texture, and cooking time.

In summary, milling flour with a Victoria grain mill is a breeze when used in conjunction with an electric drill. It takes about as much time to pour the milled grain back into the hopper for an additional cycle of milling as it takes to actually mill each cycle. I recommend using a variable speed electric drill set at low speed.

**14 December, 2017**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Recommended Publication**

The following attached publication might be of interest to you:

*‘Why renewable energy cannot replace fossil fuels by 2050: A reality check”* by Robert Lyman, 2016 - Download link [here](https://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjI4O6Ap7jbAhVIyrwKHcwKCOEQFggnMAA&url=https%3A%2F%2Fwww.friendsofscience.org%2Fassets%2Fdocuments%2FRenewable-energy-cannot-replace-FF_Lyman.pdf&usg=AOvVaw2HYF6MdElmAA7okyVcJnFu)

**11 January, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Recommended Publication**

The publication *"The early history of modern ecological economics”* by Ropke, 2004 might be of interest to you. Download link [here](https://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwij88eSqLjbAhUByLwKHW2FAk8QFggnMAA&url=https%3A%2F%2Fpdfs.semanticscholar.org%2F5525%2F00a2a8636bf2775263c74276a1e6e7ba6ce2.pdf&usg=AOvVaw3n6cOuYfQBJ8fOgfD-n9CR)

**19 January, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Recommended Video**

You might be interested in viewing the following 20-minute video:

*“CARTA: Awareness of Mortality: Mind Over Reality Transition: Evolution of Human Mortality Denial”* - Ajit Varki - YouTube link [here](https://www.youtube.com/watch?time_continue=2&v=dqgYqW2Kgkg)

**29 January, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - The Catalan Integral Cooperative**

Thank you for your recent link. Much appreciated. I have downloaded the publication *"The Catalan Integral Cooperative: an organizational study of a post capitalist cooperative"* from the [P2P Foundation](https://p2pfoundation.net/the-p2pf-library) and have done a quick scan read.

What I find most striking is that the cooperative follows very closely what has been promoted by the Schumacher Center for New Economics which was founded in 1980. For more resources along the same vein than what the P2P Foundation currently provides, have a look at the [Centre for New Economics](http://www.centerforneweconomics.org) website.

**30 January, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Net Loss Using PV Panels in Germany**

The publication *"Solar PV has a net energy loss in Germany and Switzerland: EROEI = .82"* summarised and commented on by Energy Skeptic might be of interest to you. The blogs by [Energy Skeptic](http://energyskeptic.com) might come across as being unduly pessimistic. However, I have found her blogs to be reliably well researched, and I will be following up the citations of the above publication with great interest.

**01 February, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Why Humans Rule the World Video**

Here is an interesting and relevant TEDTalk by Yuval Noah Harari on the power of belief systems - YouTube Link [here](https://www.youtube.com/watch?v=XOmQqBX6Dn4)  Harari is a superb presenter and the importance of his talk for me is that we are involved in combating prevailing stories or fictions.

**02 February, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Recommended Publication “Peak Oil Vulnerability Assessment for Dunedin”**

Today I experienced the power of serendipity. Yesterday I added a *"Key Publications*" (refereed journal publications) section to my website and today I added a Peak Oil category. To track down recent publications I logged onto ResearchGate and downloaded a number of publications. To my surprise I came across the publication *"Peak Oil Vulnerability Assessment for Dunedin"* (download [here](http://www.dunedin.govt.nz/your-council/council-documents/reports/peak-oil-vulnerability-assessment-for-dunedin)) which was prepared for the Dunedin City Council by Professor Susan Krumdieck and EAST Research. Susan Krumdieck is based in Christchurch and has a very high ResearchGate ranking. It is so brilliant that this publication was commissioned by our city council and the contents are so relevant to SCAN.

**04 February, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Comment on Publication “Peak Oil Vulnerability Assessment for Dunedin”**

I have now fully read Susan Krumdieck's report and yes, lack of reference to food production is a major omission.

The DCC was required to commission such a report. I am subsequently less impressed. The DCC will not necessarily pay any heed to the report. Replacement of our electric trolley buses with diesel buses was a major mistake. It remains to be seen what action will be taken by the DCC to replace our diesel buses with electric buses. This is where SCAN can be involved, especially when the above report makes this recommendation.

To encourage Dunedin citizens of all ages to use bicycles will require a physical separation of bicycle lanes from cars on major routes. I for one want to use a bike as I did so daily between Mornington, Moana Pool, and Bayfield High School some 50 years ago. However, my perception of risk with age has changed. Being able to use the tunnel from Green Island to the City would solve a major impediment for older citizens in Green Island to use a bike to go to the city. Using an electric bike over the hill is one solution, but at $3,000 it is an expensive solution for each cyclist. As an aside, if one already has a bike, it is possible to go electric with a conversion kit for under $1,000. Nonetheless, I for one will not cycle until there is a physical separation between bike and car on major routes. Other cities have done this. Dunedin can also do this.

**05 February, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - A More Comprehensive Report on Sustainability**

With regards to the report *“Peak Oil Vulnerability Assessment for Dunedin"* prepared for the Dunedin City Council by Professor Susan Krumdieck and EAST Research and its omission of food production (there are also other omissions)), I have come across the following far more comprehensive report on urban sustainability:

*"Pathways to Urban Sustainability: Challenges and Opportunities for the United States"* prepared by the National Academy of Sciences Engineering Medicine, 2016. - Amazon.com link [here](https://www.amazon.com/Pathways-Urban-Sustainability-Challenges-Opportunities/dp/0309444535)

In being far more comprehensive, the report is far more daunting to read in full. I suggest you look at the findings and recommendations on page 126 onwards.

**14 February, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - The Next System Project**

Thanks for your link to ["The Next System Project"](https://thenextsystem.org) website you posted on Facebook. This is a very fruitful website which in turn links to another website [Democracy Collaborative: Building Community Wealth](https://democracycollaborative.org) which leads on to the YouTube video [The Pluralist Commonwealth](https://www.youtube.com/watch?v=yEEzripANUQ)  There are many more video links from the above websites.

At long last I have made a start on writing *"In Search of Steady State Revisited"* an update of my 1978 sub-thesis "In Search of Steady State". The first edition update will be a major rewrite of the scope and content that I wrote in 1978. Later editions will include additional scope and content.

After collecting and processing resources since August 2015 I am now firmly convinced of the following:

*Action depends on Motivation which depends on Belief. Without Belief, there is no Action.*

Belief in turn depends on many factors, including understanding. A full understanding is unnecessary. We are all reliant on information from many different sources. Confidence in the sources of information is necessary before accepting and taking on board partial understanding. As I have said a number of times before, we are all involved in an engagement of competing stories.

**16 February, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Jeremy Leggett's PPT Slides on Global Climate Change Action**

You might be interested in downloading the PowerPoint slides from Jeremy Leggett's website (download links [here](https://jeremyleggett.net/2018/02/15/the-history-and-future-of-the-global-energy-transition-2016-2017-in-pictures-and-charts/)) . The three sets of slides (I have just viewed the first - 98 slides) show global commitment towards Climate Change Action. Note that Jeremy Leggett invites others to make use of his slides as follows:

"This presentation, to accompany the publication of the updated edition of “*The Winning of The Carbon War”*, is downloadable in 3 parts:

As PowerPoints: Part 1 / Part 2 / Part 3

The PowerPoint slides contain source URLs in the notes. The book does not have embedded URLs, so hopefully this is a useful additional resource.

As pdfs: Part 1 pdf / Part 2 pdf / Part 3 pdf

Please feel free to use the PowerPoint anyway you see fit, if you wish. You can extract whatever slides you like, and edit your way. My main rationale in all this is to help get the message out for those of us worried about climate change."

**23 February, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Local Currencies**

The following link on local currencies might be of interest to you: Centre for New Economics link [here](http://www.centerforneweconomics.org/content/local-currencies)

The Schumacher website has on screen a 70-page book about local currencies by Ralph Borsodi, 1989. This book is very readable and is free share.

**23 March, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Recommended Book on Energy Prices**

The following IMF publication might be of interest to you:

*“Getting Energy Prices Right: From Principle to Practice”* by Ian Parry, Dirk Heine, Eliza Lis, and Shanjun Li, 2014 - Download link [here](https://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjBl7ySobnbAhWFUrwKHShzCPkQFggnMAA&url=http%3A%2F%2Fwww.greenfiscalpolicy.org%2Fwp-content%2Fuploads%2F2014%2F11%2FGetting-Energy-Prices-Right-Full-Publication.pdf&usg=AOvVaw3goFRUsVPcY1qZvQ-qsYbd)

**24 March, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Recommended Video on Water Scarcity**

I recommend viewing the following video: “*Water Scarcity”* - Brian Richter - YouTube link [here](https://www.youtube.com/watch?v=0dJtA9cUF1c).  Brian Richter is a superb presenter, and so too is the content of his presentation.

**24 March, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Publication on Water Scarcity**

A follow on publication about water scarcity: “*Water Share: Using Water Markets and Impact Investment to Drive Sustainability”* - Brian Richter Lead Author - Download link [here](https://global.nature.org/content/water-share-report)

**27 March, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Article on Neoliberalism**

The well written article “*Neoliberalism – the ideology at the root of all our problems”* by George Monbiot published in The Guardian 2014 might be of interest to you. The Guardian link [here](https://www.theguardian.com/books/2016/apr/15/neoliberalism-ideology-problem-george-monbiot)

**29 March, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Blog on Carbon Taxing**

With regards to carbon markets versus carbon taxing, I have come across the attached posting which you might be interested in:

Andrew Sayer's “*Richer Poorer: Unmasking Economic Inequality”* blog link [here](https://asayer25.com)

**29 March, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Video on Carbon Taxing vs Carbon Trading**

Whether a country adopts a Carbon Tax or a Carbon Trading (Cap & Trade) approach to reducing greenhouse gas emissions is one of the most important decisions that each country can make in response to climate change. I recommend the following YouTube video which addresses the risks of adopting a Carbon Trading approach:

“*Story of Cap and Trade”* by The Story of Stuff Project - YouTube Link [here](https://www.youtube.com/watch?v=pA6FSy6EKrM)

**29 March, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Publication on Climate Cheats**

You might be interested in reading the attached publication: “*Climate Cheats”* by the Morgan Foundation, 2016 - Download link [here](https://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&cad=rja&uact=8&ved=0ahUKEwjgv8XmpbnbAhUGE7wKHQ2_CnwQFgg1MAI&url=http%3A%2F%2Fmorganfoundation.org.nz%2Fwp-content%2Fuploads%2F2016%2F04%2FClimateCheat_Report8.pdf&usg=AOvVaw2XYn8lMU3k5lNq8neasp0C)

The publication provides an excellent and detailed history of New Zealand's response to climate change and is damning of the previous government.

**04 April, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Spurious Precision of CO2e Estimates**

I agree with George Preddy's comments on the spurious precision of the estimates of carbon dioxide equivalents (CO2e) in the Drawdown Project. Spurious precision of estimates can indeed lead to spurious claims of ranking. However, I wouldn't be too quick to be dismissive of the estimates themselves, a dismissal which could be misconstrued from George Preddy's ending quote "Lies, Damn Lies, and Statistics'. Given the complexities involved with any estimate of CO2e, we sorely need estimates of CO2e from a variety of hopefully independent sources in order to confirm the magnitude CO2e of different activities, services, and products. It is the magnitude rather than precision that provides a proper perspective as to where we are best able to reduce greenhouse gas emissions. Too much concentration on the trivial contributions diverts our attention away from the major contributions. I thoroughly recommend the following Kindle book (US $6.19) which is cheerily upfront about the precision of its estimates of CO2e:

*“How Bad Are Bananas?: The Carbon Footprint of Everything”* by Mike Berners-Lee, 2011 - Amazon.com link [here](https://www.amazon.com/How-Bad-Are-Bananas-Everything/dp/1553658310/ref=sr_1_1?s=books&ie=UTF8&qid=1522273015&sr=1-1&keywords=how+bad+are+bananas&dpID=412HieI%252BcrL&preST=_SY344_BO1,204,203,200_QL70_&dpSrc=srch)

**11 April, 2018**

**My feedback submission on the Dunedin City Council Draft 10 Year Plan**

The Local Government Act 2002 requires councils to consider sustainability issues in Long Term Council Community Plans. In August 2010 the Dunedin City Council commissioned a Peak Oil Vulnerability Analysis Report which included surveys on travel habits, private fuel consumption and vehicle dependence, and the effect of petrol prices. Peak oil is the point when the maximum rate of global petroleum extraction is reached, after which the rate of production enters terminal decline.

The Peak Oil Vulnerability Report was co-ordinated by Dr Susan Krumdieck from EAST Research consultants based at Canterbury University and this report followed an earlier report on the likely impact of climate change carried out for the Dunedin City Council (DCC) by University of Otago Emeritus Professor of Geography Blair Fitzharris.

Dr Krumdieck's report “*Peak Oil Vulnerability: Assessment for Dunedin”* was released at a Dunedin City Council press conference on 6 December 2010. The report recommended that Dunedin should work on the following objectives:

1. Plan to reduce oil consumption by 50% by 2050.
2. Transition Dunedin’s urban form with central city lifestyle development, and urban villages, accessed by 100 km of safe bikeways and pedestrian zones and served by public transport.
3. Build an electric trolley bus system using efficient modern technology made in New Zealand.
4. Improve Dunedin’s average vehicle fleet efficiency to 5 litres per 100km by 2030.
5. Audit and track fuel use in all sectors, organisations and households and develop action plans.

The Otago Daily Times reported Mayor Dave Cull as saying “both reports would be used across departments to guide long-term planning.”

Over 7 years have now passed by since the release of the above Peak Oil Vulnerability Report, sufficient time for the DCC to take on board and address the above recommended objectives. In the meantime, the New Zealand government ratified *The Paris Agreement* on 4 October 2016. The Paris Agreement entered into force on 4 November 2016 and will take effect from 2020. This agreement provides a framework for the global response to climate change. New Zealand has submitted a Nationally Determined Contribution (NDC) to reduce greenhouse gas emissions by 30 per cent below 2005 levels by 2030.

The document available for public viewing, “*The Draft Financial Strategy - Supporting Dunedin's 10 Year Plan”* states the following:

“We are planning to spend $864 million on capital projects over the next ten years, compared with   $636 million in the last 10-year plan.

… There is significant pressure on the costs of delivering core services. Some of the drivers of increasing costs include:

the need to maintain, replace and renew core, ageing infrastructure

the obligation to build new infrastructure to a higher standard transfer of costs from central government without funding to offset the costs

increased compliance costs (e.g. treatment of stormwater)

**the emerging impacts of impact of climate change on infrastructure and the wider community**

increasing expectations from ratepayers to improve service levels

just getting on and fixing things to make Dunedin a better city.

… The Council is planning to invest in projects that will attract people to the city and enhance include:

building a bridge to connect the city with the waterfront

improving the safety of Dunedin’s transport network, particularly around the Peninsula Connection and Tertiary Precinct

upgrading the central city area

upgrading the Green Island Wastewater Treatment Plan

improving the resilience of Dunedin’s water supply and stormwater infrastructure

**expanding the cycling network**.” (My bold highlighting)

Under the Local Government Act 2002 (Reprint as at July 2017), Section 101B Infrastructure strategy,

“A local authority must, as part of its long-term plan, prepare and adopt an infrastructure strategy for a period of at least 30 consecutive financial years. … The infrastructure strategy must outline the most likely scenario for the management of the local authority’s infrastructure assets over the period of the strategy and, in that context, must … show indicative estimates of the projected capital and operating expenditure associated with the management of those assets … in each of the first 10 years covered by the strategy; and … in each subsequent period of 5 years covered by the strategy”.

The increasing costs of “*emerging impacts of impact of climate change on infrastructure and the wider community*” and the planned investment projects of “*expanding the cycling network*” are the only two infrastructure projects that address a response to the issues of climate change and peak oil. The scope and scale of these infrastructure expenditures are not included in the *Draft Financial Strategy 10 Year Plan*.

A search of the DCC website for additional documentation indicates that considerations of the impact of climate change are restricted to that of flooding and that the scope of cycleways is limited way below the scale recommended by the Peak Oil Vulnerability report. No mention is made of planning for an electric trolley bus system.

Some might argue that provision of public transport falls solely under the jurisdiction of the Otago Regional Council (ORC). However, where sustainability issues exist, there is a joint ORC and DCC responsibility to respond appropriately. Under the *Local Government Act 2002*, Regional Councils” responsibilities include *Sustainable regional well-being* and *Regional land transport planning and contracting passenger services*. Territorial authorities” (DCC) responsibilities include *Sustainable district well-being* and *the provision of local infrastructure*. A region's councils (ORC and DCC) are required to meet and discuss how they will work together, and document this in a triennial agreement. They can set up formal arrangements – such as joint committees or council organisations, or informal arrangements, such as a Mayoral Forum or a Regional Forum, to help achieve common outcomes.

Given the serious impact of both climate change and peak oil on the future welfare of Dunedin citizens, I recommend that the following infrastructure projects be included in the current 2018 Dunedin City Council 10 Year Plan:

1. Initiation of a transition of Dunedin’s urban form with 100 km of safe bikeways and pedestrian zones and served by public transport as described in the *Peak Oil Vulnerability: Assessment for Dunedin* Report.

2. Initiation of an electric trolley bus system using efficient modern technology made in New Zealand as described in the *Peak Oil Vulnerability: Assessment for Dunedin* Report.

**20 April, 2018**

**Argument Map of New Zealand Council Responsibility to Mitigate Impact of Climate Change & Peak Oil**

To view JPG image on full screen, click [here](http://www.insearchofsteadystate.org/downloads/CouncilResponsibilityV04.jpg)

To save file and print on A3 sheet use your Browser to File|Save Page or Save Image as

Download [Austhink Rationale](https://www.rationaleonline.com) RTNL source file [here](http://www.insearchofsteadystate.org/downloads/CouncilResponsibilityV04.rtnl)

For information on Argument Maps - Link [here](file:///E:\WYSIWYG%20Web%20Builder%20Output\In%20Search%20of%20Steady%20State\criticalthinking-clone.html)

**20 April, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Local Currencies Pros & Cons**

I have done an Internet search of the Pros and Cons of local currencies. Links to useful websites are below. It would be a useful exercise to sift through the arguments and create an Argument Map.

Applied Rationality Blog - Link [here](http://appliedrationality.blogspot.co.nz/2009/07/pros-and-cons-of-local-currency.html)

Money Land website - Link [here](https://www.moneyland.ch/en/alternative-currencies-pros-and-cons)

Centre for Cities website - Link here

International Journal of Community Currency Research (IJCCR) - Link [here](https://ijccr.net/tag/comparison/)

The Long and Short website - Link [here](https://thelongandshort.org/growth/new-money-do-local-currencies-actually-work)

Investopedia (very useful) - Link [here](https://www.investopedia.com/articles/economics/11/introduction-complementary-currencies.asp)

Shareable.net - Link [here](https://www.shareable.net/blog/how-to-start-a-community-currency)

Reconomy - Link [here](http://reconomy.org/have-local-currencies-got-it-wrong/)

The Guardian - Link [here](https://www.theguardian.com/local-government-network/2013/jun/17/bristol-pound-local-currencies)   and [here](https://www.theguardian.com/society/2016/jun/28/community-currencies-local-economy-volunteering)

Means of Exchange - Link [here](http://www.meansofexchange.com)

**20 April, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - George Monbiot Lecture**

I recommend the lecture “*The Pricing of Everything”* by George Monbiot - YouTube link [here](https://www.youtube.com/watch?v=ni1tX0bpTR8)  This lecture is 78 minutes long. What he has to say on persuasion, mobilisation, and change are highly relevant for SCAN. At 42 min - 43 sec he addresses persuasion and 1 hr - 1 min he answers questions from the audience on mobilisation and change.

**20 April, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Banking 101 by Positive Money**

I have just finished watching a series of videos on Banking by Positive Money. This series is the best explanation of our money system that I have come across so far (Link [here](http://positivemoney.org/how-money-works/banking-101-video-course/)) The Positive Money website provides a series of transcripts of the videos which I have copied from the screen and merged into a PDF file. What strikes me is that apart from legitimate fees for services rendered, charging interest on created money is an extreme form of unearned income.

**30 April, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Insidious Assumption of Continued Economic Growth**

The 2014 publication “*Better Growth, Better Climate”* produced by the London-based Global Commission on the Economy and Climate can be downloaded [here](https://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwirgcWt57rbAhVLy7wKHTy7DnQQFggnMAA&url=http%3A%2F%2Fstatic.newclimateeconomy.report%2Fwp-content%2Fuploads%2F2014%2F08%2FBetterGrowth-BetterClimate_NCE_Synthesis-Report_web.pdf&usg=AOvVaw2WgxzCQwarjnVF49cmaFNG). The Executive Summary states the following:

"The Global Commission on the Economy and Climate was set up to examine whether it is possible to achieve lasting economic growth while also tackling the risks of climate change.

Its report seeks to inform economic decision-makers in both public and private sectors, many of whom recognise the serious risks caused by climate change, but also need to tackle more immediate concerns such as jobs, competitiveness and poverty. The report brings together evidence and analysis, learning from the practical experience of countries, cities and businesses across the world.

The report’s conclusion is that countries at all levels of income now have the opportunity to build lasting economic growth at the same time as reducing the immense risks of climate change. This is made possible by structural and technological changes unfolding in the global economy and opportunities for greater economic efficiency. The capital for the necessary investments is available, and the potential for innovation is vast. What is needed is strong political leadership and credible, consistent policies."

The above conclusion is absolute nonsense predicated upon the insidious fallacy that it is possible to sustain economic growth. I have attached an article by Al Bartlett which draws attentions to the same fallacious reasoning which we all need to be aware of and refute. (Download publications [here](http://www.albartlett.org) from Al Bartlett’s website) Al Bartlett's wrote the article in 1994 with a revision in 1998. He made many predictions about the politics of sustainability which have since unfortunately transpired.

I have yet to read the Productivity Commission draft report. I hope that it is not also predicated on the assumption that it is possible to sustain economic growth.

**01 May, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Alternative Indicators of Wellbeing**

GDP has been known to be a flawed indicator of human wellbeing for a number of decades. GDP measures economic activity regardless of whether that activity contributes to wellbeing or not. GDP also does not include unpaid activities which contribute to wellbeing. A number of studies have been carried out to make adjustments to remove negative activities and include unpaid activities. The results are very different to the published GDP figures. When these indicators are compared against GDP per capita, it can be seen that once a certain level of GDP per capita in a country has been achieved, there is little if any further increase in well-being or happiness in those countries with a higher GDP per capita. Reliance and subservience to GDP as an indicator of wellbeing is a fetish. The GDP emperor has no clothes on.

Robert Costanza's paper provides an excellent overview of alternative indicators - Download [here](https://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwiC6NOr77rbAhXGv7wKHS8XDusQFgg0MAE&url=https%3A%2F%2Fwww.researchgate.net%2Fprofile%2FIda_Kubiszewski%2Fpublication%2F305805534_Modelling_and_measuring_sustainable_wellbeing_in_connection_with_the_UN_Sustainable_Development_Goals%2Flinks%2F57caae6908ae3ac722b1e6e0%2FModelling-and-measuring-sustainable-wellbeing-in-connection-with-the-UN-Sustainable-Development-Goals.pdf&usg=AOvVaw03za0AhtrYFEyEmn7Ed6ys)

The PDF printout of the CASSE PowerPoint file includes notes to accompany each slide and provides an introduction to the use of GDP as an indicator - Download [here](https://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwiJuLvz77rbAhWBWLwKHYZTCtgQFggpMAA&url=http%3A%2F%2Fsteadystate.org%2Fwp-content%2Fuploads%2FCASSE_Brief_GDP.pdf&usg=AOvVaw3tzoupG9Vazlxax8MaFPSY)

Alternative indicators have been developed by the United Nations - Download [here](https://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjUkoqp7rrbAhWLa7wKHbf1DQAQFggsMAA&url=http%3A%2F%2Fwww.un.org%2Fesa%2Fsustdev%2Fnatlinfo%2Findicators%2Fguidelines.pdf&usg=AOvVaw3Hk-Ijdya6TM16ZyVZQGll)

The Genuine Progress Indicator is currently used worldwide by governments and non-governmental organisations - Download [here](https://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwiR5tWC77rbAhVIbbwKHTuxDVkQFggsMAA&url=http%3A%2F%2Fase.tufts.edu%2Fgdae%2FCS%2FGPI.pdf&usg=AOvVaw3tqFL4UaL715IycVDFnx50)

It is possible to improve wellbeing without increasing population numbers and, indeed, it is essential to limit population growth in order to ensure wellbeing of future generations. Our current problem of climate change is largely due to an enormous population expansion over the last century combined with an increasing use of fossil fuels per capita. As Al Bartlett has pointed out many times, continued population growth will now thwart efforts to curb generation of greenhouse gases.

Is it possible to retain our current level of well-being without increasing consumption of fossil fuel energy and resources before 2050? The answer to that question is one which seriously concerns me. Use of fossil fuel energy and resources will be necessary to set up the infrastructure for renewable energy generation and the replacement of fossil fuel-based transportation systems and food production systems reliant on fossil fuels. This investment is very large and we need to make this investment at the very same time that we need to curb our use of fossil fuels so as to avoid runaway climate change. I fear that many, if not most, global citizens will want to continue with their current lifestyle which means that the large-scale investment we need to make to enable transition would result in increases in greenhouse gas emissions.

In order to reduce our greenhouse gas emissions at the same time as investing in a transition to a renewable energy-based economy, we need to divert current investment away from some non-essential and less-essential activities and all those activities which promote and assist a continuation of a fossil fuel reliant economy.  Structural economic changes need to be made and some sacrifices will be unavoidable. We all need to be well aware of the conflict of interest between the desires of our current generation and the needs of future generations in order to come to a resolution. What the eventual outcome will be in 2050, I simply don't know. I know what I would like to happen, but wanting is not enough.

**02 May, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Documentary -’Where to Invade Next’**

Last night I watched the 2-hour documentary *"Where to invade next"* by Michael Moore that I had recorded from Maori Television a few days ago. The content of the documentary relates directly to the topic of my last email - wellbeing.

Michael Moore visits a number of countries to investigate the quality of life there compared to the United States. The results are most illuminating - good examples of where higher levels of GDP per capita do not necessarily correlate with higher levels of wellbeing. One item I found of note in the documentary is the proportion of taxes that the United State spends on the military - 54% of discretionary spending. I followed up on this as follows on Quora.com - Link [here](https://www.quora.com/What-percentage-of-U-S-federal-income-tax-revenue-is-spent-on-military-activity-offense-and-defense) The above documentary can be viewed on demand - Link [here](https://www.maoritelevision.com/tv/shows/feature-documentaries/S01E001/where-invade-next)

**02 May, 2018**

**Low Emissions Economy Draft Report**

I have made a start on reading and processing the 500 page *“Low-emissions economy Draft Report”* published by the New Zealand Productivity Commission. As part of my processing, I have made a start on highlighting various sections of the report. The following is a sample between asterisks:

\*\*\*start on page i to iii

“... Scope and aims

“The purpose of this inquiry is to identify options for how New Zealand could reduce its domestic greenhouse gas emissions through a transition towards a lower emissions future, while at the same time continuing to grow incomes and wellbeing.

wo broad questions should guide the inquiry:

What opportunities exist for the New Zealand economy to maximise the benefits and minimise the cost that a transition to a lower net-emissions economy offers, while continuing to grow incomes and wellbeing?

To answer this, the inquiry will need to examine New Zealand's current patterns of economic activity and the ways in which these are contributing to the country's greenhouse gas emissions.

*It will then need to consider the different pathways along which the New Zealand economy could grow and develop so as to achieve New Zealand's emissions targets, as well as respond to the physical effects of a changing climate.*

... As part of analysing these pathways, the inquiry should also examine how they could affect broader economic objectives for increasing wellbeing and achieving higher living standards, including sustainability, economic growth (including productivity growth), increasing equity, social cohesion, and resilience to risk. ...

Exclusions

This inquiry should not focus on the suitability of New Zealand's current, or any future emissions reduction target. In addition, the inquiry should not focus on the veracity of anthropogenic climate change, and should only consider the implications of a changing climate to inform consideration of different economic pathways along which the New Zealand economy could grow and develop.”

\*\*\*finish (my own italic highlighting)

\*\*\*start of page 16

“Importantly, the Government has asked the Commission to look at actions that will maximise the benefits and minimise the cost of the transition, while continuing to grow incomes and wellbeing. *Wellbeing is a very broad concept that encompasses a range of dimensions, including current quality of life and material conditions as well as sustaining the resources needed for future wellbeing (OECD, 2017b). Thinking on the ambit of wellbeing is still developing. The Treasury, for instance, is building on OECD work to adapt the concept to New Zealand’s circumstances and values (King et al., 2018).*

*At the core of sustaining future well-being are four types of “capital” – natural, human, economic and social (OECD, 2017). Mitigating climate change is, of course, central to preserving natural capital for future generations. Taking opportunities to maintain and build all these types of capital in the transition will contribute to future quality of life and material wellbeing.* Innovation will be central, by finding ways to reduce emissions at low cost, while providing a means to develop new enterprises and ways of living that are consistent with a low-emissions economy. Reskilling will build the human capital needed; actions to reduce emissions will have other environmental benefits (such as improved water and air quality). Developing formal and informal institutions and organisations to set common goals and gain commitment will build social capital. Making sure the costs and benefits of the transition are understood and shared fairly, and that they unfold in a measured way, will also contribute to social capital.

*While the Commission does not explicitly address the effects of mitigation efforts on wellbeing in this report, each chapter, in its own way addresses the relevant contributors. The Commission plans to draw these together more systematically for its final report.*”

\*\*\* finish (my own italic highlighting)

My initial observations:

Growth in wellbeing in the report is essentially predicated on growth in GDP. I have done a word search for alternative indicators of wellbeing and cannot find any.

I have done a word search of "equity". The word "equity" is mainly used in relationship to financial equity. It seems to me so far that social equity has been skimmed over.

I have done a word search of "peak oil". There is no reference. I suspect the report does not address the impact of an inevitable decline in the rate of supply of fossil fuels in the long term.

I have done a word search of the words "limits" and "limits to growth". So far, I cannot find any reference to limits to growth. There seems to be an assumption that climate change is a problem to be resolved without addressing the cause of the problem. Climate change is seen as a threat to sustainability and once that problem has been rectified, growth in the economy can and should continue.

**03 May, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Interview with George Monbiot**

I recommend the following video interview with George Monbiot on YouTube, *'Climate Change Goes Deeper Than Capitalism'* - Link [here](https://www.youtube.com/watch?v=X9ViX90ehOQ)

**03 May, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - United Nations Report on Good Security**

A number of organisations in New Zealand have commissioned Vivid Economics (based in the UK) to model predictions and or write their reports listed below.

*“Net Zero in New Zealand: Scenarios to achieve domestic emissions neutrality in the second half of the century - Vivid Economics 2017”* prepared for GLOBE-NZ.

“*Green Growth: Opportunities for New Zealand - Vivid Economics 2012*” prepared for the New Zealand Green Growth Research Trust.

*“Westpac NZ Climate Change Impact - Vivid Economics Model 2018”.*

*“Economic growth in a low carbon world: How to reconcile growth and climate through energy productivity: A analysis of energy demand trends and drivers in low carbon scenarios prepared by Vivid Economics for the Energy Transition Commission 2017”*.

*“Modelling the transition to a lower net emissions New Zealand: Interim Results”* - Vivid Economics 2018

Vivid Economics promotes itself on its website as follows:

"Vivid Economics: We Generate Lasting Benefit for Business and Society by Putting Economics to Good Use

The challenge of securing sustainable and inclusive economic growth across the globe is fundamental to human well-being. From advanced economies facing a sectoral slowdown and stagnating median incomes, to emerging economies enjoying rapid growth in the shadow of increasing environmental and macro-economic risks, to low-income countries seeking to move onto new growth pathways, the need for a smart understanding of economic growth and development has never been greater.”

There is good solid information in these reports and yet a number of the conclusions and recommendations are counter to sound principles of sustainability. To me, the reports seem to be written by accountants, financiers, bankers, and neoliberal economists making use of assumed increases in efficiencies, productivity, and growth in GDP. The modelling is based on assumptions and wishful thinking with scant regard to physical realities and what is actually possible. No mention is made of peak oil.

I have come across the following United Nations Conference on Trade and Development publication called:

*"Trade and Environment Review 2013: Wake Up Before it is Too Late: Make Agriculture Truly Sustainable Now for Food Security in a Changing Climate"*

In comparison to the above Vivid Economics reports, the United Nations report concurs with publications that I have at hand on sustainable food production and food security. The United Nations report is a much more useful report, albeit a focus on food security.

**12 May, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Peer Reviewed Basis of Leaving Fossil Fuels in the Ground**

On 10 May 2018, The Star published the article *"Benefits of Gas Ignored by Government"* by National MP, Michael Woodhouse who advocated continued gas exploration off the Otago coast. I have made every effort to track down international peer reviewed journal publications on the pros and cons of key issues of climate change and sustainability to ensure that my understanding of each issue is based on primary reliable sources of information rather than second hand sources which are far too frequently based on opinion rather than facts and hard evidence or on an incomplete understanding of the issues. The following video and publication provide counter arguments for leaving fossil fuels in the ground based on empirical research.

*“The Extent, Nature and Geographical Distribution of "Unburnable" Fossil Fuels'*” - Christophe McGlade - YouTube link [here](https://www.youtube.com/watch?v=8cm3TbGZUos)

Publication in the Journal *Nature - "The geographical distribution of fossil fuels unused when limiting global warming to 2 °C"* by Christophe McGlade & Paul Ekins, 2015 - Download [here](https://www.nature.com/articles/nature14016)

As an aside, I have come across an excellent YouTube series of videos on various issues of sustainability (35 videos*): “AP Environmental Science Course”* - Paul Anderson - YouTube links [here](https://www.youtube.com/watch?v=LE9KTG9PFho&list=PLllVwaZQkS2qK4Z6xBVDRak8an1-kqsgm)  This series of videos provides an excellent resource for High Schools in New Zealand.

**18 May, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Progress on Submission to April 2018 Productivity Commission Report**

After an extensive reading of the pros and cons of Carbon Tax vs Emission Trading Schemes, I have decided that a hybrid approach should be adopted. A hybrid approach can be incorporated in an ETS.

I am still processing the recommendations of the Electricity Recommendations which are as follows:

“CHAPTER 12 - ELECTRICITY RECOMMENDATIONS

"R12.1 Given rapid changes in electricity-generation technology and potential effects of rising electricity prices on adoption of low-emissions technology in other parts of the economy, *the Government should not use subsidies or regulation to favour particular technologies that generate low-emissions electricity.*

R12.2 The Government should rely on an effective emissions-pricing system as the main instrument to achieve an efficient trade-off between emissions reductions in electricity and emissions reductions in other parts of the economy. *The Government should be cautious in specifying targets for emissions within the electricity sector, and make sure that technology is available to meet them without significantly increasing wholesale electricity prices above the levels achieved with current technology."*

I have highlighted the recommendations that I feel uneasy about in italics above.

The majority of the recommendations in the April 2018 Productivity Commission Report will go a long way to reducing emissions of greenhouses gases from the burning of fossil fuels, but we still need to use energy which either does not involve the burning of fossil fuels (i.e. renewables) or which eliminates emissions of greenhouse gases when burning fossil fuels (a new technology which could prove to be very expensive).

Setting up the infrastructure for renewable energy will involve using fossil fuels which are not necessarily burned in New Zealand (e.g. PV panels) and so too will replacement of vehicles, plant and equipment which currently make use of fossil fuels. And yet there is the assumption that we can continue to grow our economy during this transition phase while at the same time reducing greenhouse gas emissions. There are physical and thermodynamic limits to decoupling energy and GDP.

The April 2018 Productivity Commission Draft report focuses on reducing greenhouse gases, but does not address simultaneously phasing in replacement renewable energy. Who is going to generate the additional electricity that will be required? Is this going to be left entirely over to households (how many households can afford solar panels without a subsidy?) and the marketplace for private sector investment, or is the Government going to take a lead? Wind and solar, being intermittent, are unlikely to meet peak electricity demands. Geothermal energy can provide for peak demand and so too can the diversion of the current continuously supplied electricity to Comalco. Is the private sector expected to step in to provide additional geothermal electricity? There is no way that I would agree with privatisation of our water supply. Are we expected to accept privatisation of our energy supply? Ultimately reducing greenhouse gases to zero involves not only not burning fossil fuels but also providing a reliable replacement source of energy.  This issue needs to be clearly addressed in the final Productivity Commission report.

**30 May, 2018**

**My submission to the New Zealand Productivity Report *Low-emission economy NZ - DRAFT April 2018***

**SUBMISSION**

I commend the New Zealand Productivity Commission on its report *Low-emission economy NZ - DRAFT April 2018*. Given the terms of reference, including the exclusions imposed on the inquiry, the Draft Report is comprehensive and thorough. The majority of the well-considered recommendations should go a long way towards reducing greenhouse gases.

**Hybrid Emissions Pricing Scheme**

The Draft Report makes the following Recommendation R4.1 on page 416:

“The Government should reform the NZ Emissions Trading Scheme rather than replace it with a carbon tax. The reforms should provide a good balance between control over unit supply (i.e., an effective emissions cap) and protection against excessive volatility in the price of emission units. The reforms should also provide the institutional and regulatory underpinnings for a credible and efficient market in emission units, as well as transparency and forward guidance to incentivise long-term investments in lower emissions.”

There are clear cut and distinctive advantages and disadvantages of a pure Carbon Tax versus a pure Emissions Trading Scheme (ETS) which are addressed in the preamble and findings that precede R4.1. Given the combination of the preamble and findings followed by the wording of R4.1, the intent of R4.1 seems to seek the advantages of both a Carbon Tax and an ETS. Such a scheme would be a hybrid scheme as described in the public literature and recommended by a number of sources1, 2.  The devil of implementation of a hybrid scheme lies within the details. For example, a hybrid scheme can be an ETS which not only caps a limit on emissions, but also sets a minimum price cap which effectively results in a minimum carbon tax2.

*I recommend that New Zealand adopts a Hybrid Emissions Pricing Scheme with a cap on emissions and a minimum cap on carbon pricing with full Government control over the auction process.*

**Impact of Peak Oil**

A number of recommendations in the Draft Report are predicated on the expectation of a business-as-usual scenario during a transition phase through to 2050 and there is an implicit assumption that potential disruptions can and will be mitigated. This is understandable given that the primary purpose of the report on page iii is to provide guidance on how to “manage a transition to a lower net emissions economy, while still maintaining or improving incomes and wellbeing”. The restrictions of the Terms of Reference imposed on the Draft Report may have resulted in an omission to address the impact of peak oil, an omission which is a major flaw of the report. Chapman (2014) summarises the debate about peak oil as follows3:

“Up until recently Peak Oil was a major discussion point crossing from academic research into mainstream journalism, yet it now attracts far less interest. This paper evaluates the reasons for this and on-going relevance of Peak Oil, considering variations in predictive dates for the phenomenon supported by technological, economic and political issues. Using data from agencies, the validity of each position is assessed looking at reserves, industrial developments and alternative fuels. The complicating issue of demand is also considered. The conclusions are that, supported by commercial interests, an unsubstantiated belief in market and technical solutions, and a narrow paradigmatic focus, critics of Peak Oil theory have used unreliable reserve data, optimistic assumptions about utilisation of unconventional supplies and unrealistic predictions for alternative energy production to discredit the evidence that the resource-limited peak in the world's production of conventional oil has arrived, diverting discussion from what should be a serious topic for energy policy: how we respond to decreasing supplies of one of our most important energy sources.”

Chapman concludes:

“…the evidence is that conventional oil production has peaked and prices will rise, though this is unlikely to benignly encourage a shift to new fuels. … Rather than continuing to argue for or against the topic, Peak Oil should be acknowledged as part of a complex energy situation with the realisation that cheap fuel is no longer available and we now face circumstances where prices will increase and high energy-based growth will be limited. …Like the oil crisis of the 1970s, this is a situation of great importance that requires leadership, discussion and analysis on a global level. Many aspects of modern life will be impacted by conventional oil output falling and co-ordinated action between diverse agents will be required.”

A transition from a fossil fuel-based economy to one that is in turn reliant on renewable energy will be necessary regardless of the impact of climate change and the need to reduce greenhouse gases. A transition from fossil fuels to renewable energy will of course reduce greenhouse gas emissions, but a major problem is that such a transition will require use of fossil fuels to set up new infrastructure, plant, machinery, vehicles etc. (embodied energy) at the very same time as the need to reduce greenhouse gas emissions. In order to satisfy both requirements, use of fossil fuels will therefore need to be diverted from that of consumption to that of investment. Expectations that business as usual can and will continue during a transition from fossil fuels to renewable energy are unrealistic.

*I recommend that the Final Report addresses issues of peak oil and allied contingency planning.*

**Meeting Peak Electricity Demand**

The Draft Report states on page 294 that “Electric vehicles are one of New Zealand’s most promising mitigation opportunities.”  An assumed 100% fleet of electric vehicles in New Zealand by 2050 would require substantial additional electricity generation. The Draft Report addresses ways of reducing demand for electricity in a number of sectors in the economy and mentions on page 333 that the Comalco smelter plant at Tiwai Point could be “incentivised” to help smooth demand peaks and reduce the need for on-call thermal generation. Comalco currently uses 570 MW of electricity5 which is about 15% of current peak hydro electricity output. This level of continuous consumption of electricity begs the question of whether Comalco’s continued use of electricity should take priority over New Zealand’s need for additional electricity during the transition phase from fossil fuels to renewable energy. A comprehensive study of peak demand and risk should include not only “incentivisation” to help smooth demand peaks but also address the issue of whether Comalco should continue to use such a large percentage of New Zealand’s hydroelectricity output.

In a submission to the Commerce Committee, The New Zealand Aluminium Smelters Limited (NZAS) wrote the following statement to Jonathon Young, Chairperson, Commerce Committee, on 12 March 20136:

“New Zealand Aluminium Smelters Limited (NZAS) welcomes the invitation to make a submission to the Commerce Committee’s consideration of the petition of Eric Roy MP requesting that “the House encourage the Government to see Meridian and Rio Tinto renegotiate a viable power supply contract to save Tiwai Point aluminium smelter, and note that 3,110 people have signed postcards supporting this request.

… During the 1960s, the New Zealand government granted the then owners of the Tiwai Point smelter, Comalco, 99-year water rights in order to develop both the Manapouri Power station and the NZAS smelter. Due to financing difficulties, Comalco could not finance both the Manapouri power station and the NZAS smelter. In order to keep the option alive, the Holyoake Government of the day acted to accept the water rights back from Comalco and in return finance and build the Manapouri power station. The Government also committed to provide to Comalco a 93-year power deal (until 2060) to supply affordable power to the smelter. In return, Comalco agreed that the power price structure would cover the operating costs of the Manapouri Power Station, pay back the capital cost of construction and provide a premium.

In short, Manapouri was built for a specific purpose – to provide long-term affordable power to the smelter, and the power station was paid for by the smelter owners, not the New Zealand tax payer. If the smelter had never existed, the power station would also not exist today.”

The above statement that the Manapouri Power Station was paid for by NZAS as an argument for NZAS to continue using electricity generated by the Manapouri Power Station is fallacious. It is equivalent to a tenant claiming the right to continue renting a property because the landlord pays down a mortgage on the property from the rent received. Ownership and control of electricity generated from the Manapouri Power Station belongs to New Zealanders and not NZAS.

*I recommend that Government carries out a study of the impact of Comalco continuing its current consumption of electricity when additional electricity will be needed by electric vehicles and electrification of the city-to-city New Zealand railway network.*

**Electrification of City-to-City Railway Network**

The Draft Report addresses electrification of the North Island Main Trunk line and the advantages of doing so on page 310, but does not include a recommendation to electrify New Zealand’s city to city railway network. The Draft Report assumes and endorses that market place forces alone will result a major transition from fossil fuelled vehicles to EVs by 2050. A major uptake of EVs is technically feasible, but is not necessarily viable given the high private costs of purchasing EVs and replacement of their batteries, whereas an essential electrification of New Zealand’s railway network is both technically feasible and viable provided Government undertakes the commitment to do so.

*I recommend that Government electrify the city-to-city New Zealand railway network*.

**References**

1.Partnership for Market Readiness (PMR) and International Carbon Action Partnership (ICAP). 2016. *Emissions Trading in Practice: A Handbook on Design and Implementation*. World Bank, Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO.

2.PricewaterhouseCoopers. *Carbon Taxes vs Carbon Trading:  Pros, cons and the case for a hybrid approach*. March 2009.

3.Chapman, I. The end of Peak Oil? Why this topic is still relevant despite recent denials. Energy Policy Vol. 64, 2014, pp. 93-101.

4.Carl, J. and D. Fedor. Tracking global carbon revenues: A survey of carbon taxes versus cap-and-trade in the real world. Energy Policy Vol. 96, 2016, pp. 50-77.

5.<https://en.wikipedia.org/wiki/Tiwai_Point_Aluminium_Smelter>

6.Letter of submission from New Zealand Aluminium Smelters Limited to Jonathon Young, Chairperson, Commerce Committee dated 12 March 2013.

**25 June, 2018**

**Sustaining Public Capital Stock**

One of the $1 books I purchased at the recent Regent Theatre Book Sale here in Dunedin, New Zealand, is *“The World Without Us”* by Alan Weisman, 2007 - Amazon.com link [here](https://www.amazon.com/World-Without-Us-Alan-Weisman/dp/0312427905/ref=sr_1_1?keywords=%E2%80%9CThe+World+Without+Us%E2%80%9D+by+Alan+Weisman&qid=1570734441&s=books&sr=1-1). I followed the recent TV series which I assume was based on this book. Both the TV series and the book make for very interesting reading and provide an alternative perspective and insight into our impact on the environment. The book describes the decay process of our buildings and infrastructure when humankind is no longer around to sustain its capital stock.

I am especially interested in the decay and degradation process of capital stock and the life cycle costing of sustaining capital stock - the cycle of new capital stock, maintenance, refurbishment, replacement and recycling. Most people are focused on the growth of capital stock and take the maintenance, refurbishment, and replacement of our existing capital stock for granted. The resources required to sustain our current capital stock, nonetheless add further growth, are substantial. It is very easy to live off and "consume" our capital stock provided by previous generations by deferring necessary maintenance and refurbishment. This also applies to the fertility of land which also should be sustained from generation to generation.

Growth in GDP (for example economic activity to add to capital stock) can be achieved at the expense of the condition and accelerated depreciation of our current capital stock. Investment for private benefit can be diverted away from providing the necessary resources to sustain public capital stock. Those who advocate investment to promote growth in GDP generally also advocate lower taxes, taxes which are needed to sustain our current public capital stock. Examples of public capital stock include our schools and hospitals which have suffered from deferred maintenance over the last decade. Our public capital stock should include our national railway and electricity supply systems. These systems were provided and sustained by previous generations and ownership of any public capital stock, especially our water supply systems, should never be sold off to private enterprise.

If sustaining our electricity supply system requires a replacement of fossil fuels with renewables, and doing so requires extending its use of renewables to enable a transition away from fossil fuels used by cars to electricity used by EVs, then our taxation system should be tailored and geared to enable this transition regardless of political lobbying by special interest oligopolies and monopolies based here in New Zealand and overseas. There seems to be a direct conflict between private interests and the public good in New Zealand and very likely also elsewhere. Private interests tend to focus on short term benefits whereas genuine sustainability focuses on the long term. Our elected leaders have a responsibility and duty to take on board a long-term view on behalf of our current and future generations. The forthcoming Zero Carbon Act here in New Zealand should and needs to mirror this responsibility and duty.

**25 June, 2018**

**A Tale of a City and Townships, A Story of Sustainability**

The following ideas were prompted by the futuristic film *“Escape from New York City”* in which Manhattan Island is walled off in 1995 and turned into a prison. When watching the film, I immediately became aware that the poetic license of the film did not address the need for a continuous flow of food and water etc. for the prisoners. A high-density city simply cannot be self-sufficient and sustain itself if it is cut off by a wall or boundary.

There is a similar cutting off system boundary in Stephen King’s book *“The Dome”* and the video series based on the book. A township and surrounding countryside are cut off from the rest of the world by a transparent dome. The township can be sustainable and it would have sufficient food production potential to have a surplus.

An extreme case of a system boundary is Robinson Crusoe on a desert island. It is possible for Robinson Crusoe to survive so long as the island can provide food, water, and shelter. The level of survivorship depends on the tools that are available and Robinson Crusoe’s industry. The addition of Man Friday increases possibilities.

What is common to all three scenarios is the need for food and water. The extent of shelter will depend on what is available. If food and water is not available at a location, then inhabitants cannot survive. If it is possible to move across the system boundary, then efforts will be made to do so.

A bounded high-density city cannot provide sufficient food production because the potential to grow enough food for one person per unit area is much less than the number of persons needing food per unit area.

The population of the townships and surrounding countryside within each dome can be self-sufficient and not all townspeople will be required to grow food.

If the boundaries between a city and a number of surrounding townships enclosed by domes are removed, then it is feasible, though not necessarily viable, to transport surplus food from the countryside to the city.

In order to produce surplus food for a city, more townspeople and more energy slaves in the form of farm machinery could be used to grow the surplus food.

Farm machinery and transportation of food from townships to a city requires the use of energy.

Fossil fuels will eventually become unavailable (the EROI will inevitably decline to 1.0) and humankind will need to depend on renewable energy.

The EROI of renewable energy is a lot less than that of current fossil fuels.

The EROI of energy and the magnitude of the energy flow production that can be provided by renewables both limit what is possible to sustain within human settlements.

When the EROI of energy declines below a minimum level, priority and preference will be given to the production of food which is local instead of transporting food over long distances.

Townships could shift closer to the city to reduce this distance, or the population of the city could move to the townships.

It is easier for the city population to shift to the townships in order to make use of existing shelter and infrastructure in the townships and build additional shelter in the townships than to shift entire townships closer to the city.

As the EROI of energy declines, there would be a reversal of urbanisation because inhabitants in the city need to seek local food production.

The type of society we will have in the future will have a hierarchy of what it needs followed by what it desires.

One of the systems that society will want to retain is that of knowledge.

A knowledge system requires storage and means of transfer from generation to generation, each of which requires energy.

The level of sophistication of humankind’s future knowledge system will depend on the EROI of renewable energy.

An indication of the type of society that is possible in the future can be suggested by the type of energy and the energy slaves per capita used by previous generations.

A transition from fossil fuels to renewables will require an investment in new infrastructure and capital stock.

To avoid malinvestment, it is wise and sensible to invest in a future that is possible rather than one which we desire to have based on what we already enjoy.

The correct direction of transition is of more immediate importance than numeration of the scale or magnitude and timing of transition. Necessary adjustments can be made as we go along.

A reversal of urbanisation will assist a transition more so than attempting to adapt our current cities to accommodate a decline in the EROI of energy. This principle applies more so the greater the density of population in each city.

The message of my above argument is that current settlement patterns cannot be sustained. The degree of urbanisation in New Zealand continues to increase and is encouraged and enabled by those who promote growth in GDP. The need to reduce greenhouse gas emissions is but only part of the pathway and transition to sustainability for future generations. A principle of systems dynamics is to always consider the system above that which is under current scrutiny, otherwise the best of intentions and efforts to address and change what is under scrutiny might be confounded.

**26 June, 2018**

**Modified copy of email to Seniors Climate Action Network (SCAN) - Feedback on “A Tale of a City and Townships, A Story of Sustainability”**

Thank you all for your feedback on my "*A Tale of a City and Townships: A story of Sustainability*". Much appreciated.

Forty years ago, in 1978 a group of architectural students in their final year sub-thesis came to the conclusion that then current settlement patterns in New Zealand were unsustainable. A number of researchers today are now coming to the same conclusion. For example, Ted Trainor writes:

“a core claim of The Simpler Way project (2017) is that a sustainable and just society based on 100% renewable energy supply is desirable and could be easily achieved, but only if there is a radical transition to new settlement patterns, economies, political systems, and most difficult of all, new values and non-affluent conceptions of the good life”.

Simpler Way website link [here](http://simplerway.org)    Simplicity Institute website link [here](http://simplicityinstitute.org)    Resilience.org website on The Simpler Way link [here](https://www.resilience.org/stories/2012-02-18/simpler-way-practical-action-plan-living-more-less/)

My use of the walled city and domed townships is unnecessary to convey the well-known and accepted principles of Central Place Theory. I used this story approach by way of poetic licence. Central Place Theory explains how the growth of cities became possible based on changes in transport costs. When humankind relied solely on travel by foot, concentration of populations in cities was impossible.  As technology of transport developed - the wheel and the cart pulled by animals, boats then ships, improvements in road construction, the car which uses high grade fossil fuel and especially trucks - and the energy for use by transport increased, concentrations of populations in larger cities became possible. Central Place Theory also explains the process of reverse urbanisation.

The level of technology that is possible in the future depends on the average EROI of the energy that humankind is able to make use of. The costs of transport will depend also on the average EROI because there will be many competing demands for energy, and these costs will increase as the average EROI of a combination of fossil fuels and renewables decline to that of only renewables.

There is a lot of flesh to be inserted between the bones of my argument that a reversal of urbanisation will need to take place to ensure the sustainability of future human settlements. For example, I have not addressed the use and issue of nuclear power. One question which begs to be asked and answered is whether our current settlements patterns are desirable or not. Would a transition from fossil fuels to renewables be easier if we did not have concentrations of high-density cities?

There are much larger cities around the world than Auckland, but how many countries have over one third of its population concentrated in one city? Countries like the UK and especially France have many smaller and dispersed settlements as well as large cities.  I have travelled by plane over France a number of times and what was most striking for me when looking out of the window was that for mile after mile under the flight path there are villages after villages all closely connected by networks which mirror the patterns described by Central Place Theory. The settlement patterns of these connected villages and towns developed over centuries, whereas in New Zealand settlements developed comparatively recently when technology was much more developed and soon before when access to and use of fossil fuels took off. Do the same flight by plane over New Zealand and you will see very few villages and townships that are close together. Populations are more concentrated and far apart with an extreme concentration in Auckland.

Urbanisation is still taking place in New Zealand. The population of Auckland is still increasing and higher density housing is touted as the answer. However, there are some signs of a reverse trend due to high house prices in Auckland. A number of families are choosing to buy homes in smaller towns and commute to Auckland. Ideally, employment in their new town is preferred, but is not always available. Should we encourage a continuation of urbanisation in New Zealand or should we support and promote living and working in rural towns and villages?

I have attached two articles on EROI which I suggest are a must read (Download [here](http://www.insearchofsteadystate.org/downloads/Renewable-EROI-MustIncludeStorage-EnergySkeptic2018.pdf) and [here](http://www.insearchofsteadystate.org/downloads/QuestionsAboutEROI-DamnTheMatrix2018.pdf)). As I have emailed before, Energy Skeptic's approach might seem extreme to some people, but I cannot fault her research approach which is to seek out what is realistically viable as opposed to feasible. I repeat my closing words on my website that it is more important to choose the right direction and pathway of change from the outset otherwise we might make the mistake of blindly pursuing alleyways with only a cul-de-sac at the end. Humankind can ill afford costly mistakes. Whatever fossil fuels we use from now onwards should be used wisely to subsidise a transition to renewables. It is doubtful whether renewables would be able to bootstrap a transition by itself without fossil fuels subsidies and the legacy of technology that has been made possible by using fossil fuels in the past.

Sustainability is about being able to continue for a long time into the distant future and because we are all mortal, our efforts today will have the greatest impact on future generations. Should we care and take action when we are unlikely to reap the full benefits of our efforts during our own lifetime? We know that answer for ourselves and we need persuade others to be of the same ilk.

I have also attached an article on Local Food Production which might be of interest (download [here](http://www.insearchofsteadystate.org/downloads/KeyConceptsInAnalysingSustainabilityOfAgri-foodSystems-Frankova2017.pdf)).

**28 June, 2018**

**Consultation Process on the forthcoming Zero Carbon Act in New Zealand (modified 2 July 2018)**

New Zealand is currently undergoing a consultation process on the forthcoming Zero Carbon Act. A publication on this process can be downloaded from the Ministry for the Environment (MFE) [here](https://www.mfe.govt.nz/publications/climate-change/our-climate-your-say-consultation-zero-carbon-bill). On Tuesday 26 June I attended a consultation meeting held in Dunedin where the Minister of Climate Change, James Shaw, addressed the audience. MFE staff then gave a PowerPoint presentation which included an emissions profile showing the proportion of different types of greenhouse gas emissions in New Zealand based on carbon dioxide equivalents (CO2e) - carbon dioxidecontributes 44% of which 43% is transport, methane contributes 43%, and nitrous oxide contributes 12%. The meeting finished with a short question and answer session.

Each member of the audience was provided with a pamphlet, *“Our Climate. Your say!”*, which summarises the consultation process. We were asked to indicate on the pamphlet our choice(s) of what the Commission for Climate Change should do from a list, and the extent that we agreed or disagreed on the statement that “New Zealand needs a clear plan on how we are going to both assess and adapt to the risk of climate change to our people, our country and our economy”. The pamphlet also set out different options for “What is the best 2050 climate change target for New Zealand”. The wording of these options as set out in the above MFE publication and paralleled in the pamphlet are as follows:

**[MFE wording] Net zero carbon dioxide by 2050:** this target would reduce net carbon dioxide emissions in New Zealand to zero by 2050 (but not other gases like methane or nitrous oxide, which predominantly come from agriculture).

**[Pamphlet Wording] a. Net Zero Carbon Dioxide.** This target would reduce carbon dioxide to net zero. To get there we will need to reduce emissions from the energy and transport sectors – where most of our carbon dioxide emissions come from.

**[MFE wording] Net zero long-lived gases and stabilised short-lived gases by 2050:** this target would reduce emissions of long-lived gases (including carbon dioxide and nitrous oxide) in New Zealand to net zero by 2050, while stabilising emissions of short-lived gases (including methane).

**[Pamphlet Wording] b. Net Zero Long-Lived Gases and Stabilised Short-Lived Gases.** We would need to reduce carbon dioxide and other long-lived gases like nitrous oxide to net zero. We would also need to stabilise short-lived gases, like methane which comes mostly from livestock.

**[MFE wording] Net zero emissions by 2050:** this target would reduce net emissions across all greenhouse gases to zero by 2050.

**[Pamphlet Wording] c. Net Zero Emissions.** This would be the most ambitious target and would require emissions from all greenhouse gases (both long-lived and short-lived) to be reduced to net zero. To get there, there will be changes to how we use our land, we would need to plant a lot more trees and innovate more.

Information on greenhouse gases and their carbon dioxide equivalents on the [NIWA website](https://www.niwa.co.nz/our-science/climate/information-and-resources/clivar/gases) is helpful in deciding which of the above options is best. Jeanette Fitzsimons in her article ["Cutting methane hard and fast is the best path to Carbon Zero"](https://thespinoff.co.nz/society/19-06-2018/cutting-methane-hard-and-fast-is-the-best-path-to-carbon-zero/) on The Spinoff website presents a strong argument for focusing on methane. Methane is initially many times more potent than CO2 and there is a risk that if we do not cut back on emissions of methane soon enough, then there could be a runaway positive feedback effect of methane emissions from thawing tundra. Jeanette Fitzsimons supports Option B. For me, Option A is definitely not an option and supporting Option B alone is insufficient to convey the urgency and need to reduce methane gases. The wording in option B uses the words "stabilise short-lived gases" (methane) which is not the same as "reduce short-lived gases".

**28 June, 2018**

**Recommended publications and books**

I recommend the following international refereed journal publications:

*“Energy, EROI and quality of life”* by Jessica G. Lambert, Charles A.S. Hall, Stephen Balogh AjayGupta, and Michelle Arnold, 2014 – ResearchGate link [here](https://www.researchgate.net/publication/263049774_Energy_EROI_and_quality_of_life)

*“EROI of different fuels and the implications for society”* by Charles A.S. Hall, Jessica G. Lambert, and Stephen B. Balogh – ResearchGate link [here](https://www.researchgate.net/publication/259175194_EROI_of_Different_Fuels_and_the_Implications_for_Society)

The above publications are highly technical, but the data and conclusions in these publications are more reliable than what is available from many website pages or magazine articles. I am a firm believer in collecting and relying on data in primary sources than what is very often misquoted in secondary and dubious tertiary etc. sources.

The information in the above publications in combination with that in the following book strongly suggest what is possible with respect to a transition from fossil fuels to renewables:

*“Sustainable energy - without the hot air”* by David Mackay, 2009 – Amazon.com link [here](https://www.amazon.com/Sustainable-Energy-Without-Hot-Air/dp/0954452933/ref=sr_1_1?s=books&ie=UTF8&qid=1530144090&sr=1-1&keywords=%27Sustainable+energy+-+without+the+hot+air%27)  This book addresses the scale of renewable energy which would be needed in order to fully replace fossil fuels.

I have recommended the following books on this website. These books indicate where best to target reductions in greenhouse gas emissions. I believe it is worthwhile to rearrange these into the categories that fit within "Society's Hierarchy of Energetic Needs" as shown in Figure 12 of the above "Energy, EROI and quality of life" publication:

*“How bad are bananas: The carbon footprint of everything”* by Mike Berners-Lee, 2010 – Amazon.com link [here](https://www.amazon.com/How-Bad-Are-Bananas-Everything/dp/1553658310/ref=sr_1_1?s=books&ie=UTF8&qid=1530144144&sr=1-1&keywords=%27How+bad+are+bananas%3A+The+carbon+footprint+of+everything%27)  This book addresses the greenhouse gas emissions from the embodied energy involved in products, processes, and activities.

*“Drawdown: The most comprehensive plan ever to reverse global warming”* edited by Paul Hawken, 2017 – Amazon.com link [here](https://www.amazon.com/Drawdown-Comprehensive-Proposed-Reverse-Warming/dp/0143130447/ref=sr_1_1?s=books&ie=UTF8&qid=1530144197&sr=1-1&keywords=Drawdown%3A+The+most+comprehensive+plan+ever+to+reverse+global+warming%27)  This book ranks where best to target reductions in greenhouse gas emissions.

**02 July, 2018**

**New Zealand Ministry of the Environment (MFE) Discussion Document on Zero Carbon Bill & Submission**

I have just finished reading the MFE publication [“Our Climate Your Say: Consultation on the Zero Carbon Bill”](https://www.mfe.govt.nz/publications/climate-change/our-climate-your-say-consultation-zero-carbon-bill) and I have found this publication to be a fair and balanced summary of the issues. By reading the full publication I no longer have concerns that using the online Submission Form would lock me into a limited choice of options. I will now use the [online Submission Form](https://submissions.mfe.govt.nz/consultations/zero-carbon-bill/make-a-submission) with greater confidence that I will able to provide the feedback I feel is necessary by selecting one of the available options within each question and then adding my feedback in the corresponding Notes field. For example, Question 2:

“2. If the Government sets a 2050 target now, which is the best target for New Zealand?

Net Zero Carbon Dioxide - Reducing net carbon dioxide emissions to zero by 2050

Net Zero Long-Lived Gases and Stabilised Short-Lived Gases - Long-lived gases to net zero by 2050 while also stabilising short-lived gases.

Net Zero Emissions - Net zero emissions across all greenhouse gases by 2050.”

I will be selecting the third option "Net Zero Emissions: Net zero emissions across all greenhouse gases by 2050” and not the second option because this option refers to "stabilising" short-lived gases (methane). "Stabilising” is not the same as "Reducing". In the Notes field I will address the need to focus immediately on reducing methane gas emissions.

I have tested out the Notes field with a large block of text to see whether there is too small a limit on the number of characters allowed. My full block of text was able to be copied and pasted without any problems.

**09 July, 2018**

**My Submission to the New Zealand Zero Carbon Bill (Additional Comments on Submission Form) 75% Vote by Parliament to set and change targets and policies**

In order to ensure stability of political purpose and cross-party representation, the Carbon Bill should include the requirement that climate change targets and policies are set and changed only when there is a 75% of all Members of Parliament endorsement vote.

**Immediate reductions in methane gas emissions**

All countries, including New Zealand, need to reduce GHG emissions as soon as possible in order to reduce the risk of runaway methane emissions from thawing tundra. Most methods of reducing GHG emissions take time, including planting saplings to absorb carbon dioxide. In the meantime, seasonal adjusted levels of GHG in the atmosphere increase monotonically.

Methane emissions by ruminants in New Zealand contribute a major source of the nation’s carbon dioxide equivalents. A 10% reduction in methane emissions could be implemented within weeks by Government decree to reduce herd numbers. Farmers around the world have been paid not to grow crops. New Zealand can and should likewise pay its farmers to reduce their herds of ruminants and assist transition to alternative food production. In the 1970s the New Zealand economy adapted to a three-fold followed by a two-fold increase of petrol prices at the pump. This scale of adaptation far surpasses that of an immediate 10% reduction in herd numbers. New Zealand has the economic resilience to absorb the costs of paying farmers to immediately reduce their herds by 10% which would be followed by subsequent reductions in herd numbers as farmers transition to alternative food production.

*I recommend that Government immediately decrees a 10% reduction in ruminant herd numbers in New Zealand.*

**100% renewable electricity.**

New Zealand needs to phase out use of fossil fuel-based generation of electricity by 2050 and according to a confidence & supply agreement between the Labour Party and the Green Party, the nation’s Climate Commission will be requested to plan the transition to 100% renewable electricity by as early as 2035. However, in its 2018 Draft Report, the Productivity Commission’s recommendations R12.1 to R12.4 for the Electricity Authority on page 433 do not include the need and urgency for Government to invest in renewable energy projects in its programme of works. The Draft Report states on page 321 that "if reducing emissions from electricity generation significantly increases the costs of electricity, this could delay the electrification of other sectors where the reductions are potentially larger." An Emissions Pricing Scheme can provide Government with revenueand this revenue can be used by Government to invest in renewable energy projects to maintain stable electricity prices. A 2017 survey by Carl and Fedor which tracks current global carbon revenues has established that Cap-and-trade systems (ETS) earmark 70% of revenues for “green” spending. The New Zealand Government can and should follow suit by either investing directly in renewable energy projects or by subsidising smaller scale renewable energy projects initiated by City Councils, community groups, or individuals.

*I recommend that Government invests in renewable energy projects using revenue generated by an adopted Emissions Pricing Scheme in order to attain 100% renewable electricity by 2050.*

**Electrification of the New Zealand city-to-city railway network.**

The Productivity Commission’s 2018 Draft Report addresses electrification of the North Island Main Trunk line and the advantages of doing so on page 310, but does not include a recommendation to electrify New Zealand’s city-to-city railway network. The Draft Report assumes and endorses that market place forces alone will result a major transition from fossil-fuelled vehicles to EVs by 2050. A major uptake of EVs is technically feasible, but is not necessarily viable given the high private costs of purchasing EVs and replacement of their batteries, whereas an essential electrification of New Zealand’s railway network is both technically feasible and viable provided Government undertakes the commitment to do so.

*I recommend that Government electrify the city-to-city New Zealand railway network*.

**Examination of the continuation to provide power to the Tiwai Point aluminium smelter**

The Productivity Commission’s 2018 Draft Report states on page 294 that “Electric vehicles are one of New Zealand’s most promising mitigation opportunities.” A 100% fleet of electric vehicles in New Zealand by 2050 would require substantial additional electricity generation. The Draft Report addresses ways of reducing demand for electricity in a number of sectors in the economy and mentions on page 333 that the aluminium smelter plant at Tiwai Point could be “incentivised” to help smooth demand peaks and reduce the need for on-call thermal generation. The Tiwai Point aluminium smelter plant currently uses 570 MW of electricity which is about 15% of current peak hydro electricity output. This level of continuous consumption of electricity begs the question of whether the Tiwai Point aluminium smelter plant’s continued use of electricity should take priority over New Zealand’s need for additional electricity during the transition phase from fossil fuels to renewable energy. A comprehensive study of peak demand and risk should include not only “incentivisation” to help smooth demand peaks but also address the issue of whether the Tiwai Point smelter plant should continue to use such a large percentage of New Zealand’s hydroelectricity output.

*I recommend that Government carries out a study of the impact of the Tiwai Point aluminium smelter plant continuing its current consumption of electricity when additional electricity will be needed by electric vehicles and electrification of a city-to-city New Zealand railway network.*

**GDP is an inadequate indicator of wellbeing**

The two different economic models developed by Vivid Economics (Vivid) and the New Zealand Institute of Economic Research (NZIER) to gain insights into the economy-wide impacts of reaching different emissions reductions targets are both seriously flawed. This is because their projections of progress are based on projections of GDP which is not an indicator of wellbeing. GDP conflates all forms of economic activity regardless of positive or negative impacts on wellbeing. An example is the economic activity of rebuilding required after earthquakes hit Christchurch. Few people would claim that citizens in Christchurch were better off after the destructive earthquake and during the rebuild. GDP makes no adjustment for leisure time. The number of work hours can increase rather than decrease in order to retain a standard of living. GDP counts only those goods and services that are recorded through official markets and leaves out home production and black-market activity. GDP makes no adjustments for the distribution of goods and services. For example, a minority of the population can enjoy higher standards of living as GDP per capita increases while the majority struggle more and more to make ends meet. GDP does not measure externalities of economic activity. An example is the deterioration of our waterways in recent years due to pollution generated by the agricultural sector.

Nobel prize-winning economist Joseph Stiglitz noted at a World Economic Forum in Davos, Switzerland in 2016 that "GDP is a poor way of assessing the health of our economies and we urgently need to find a new measure." There are alternative indicators of welfare. For example, the *Index of Sustainable Economic Welfare* accounts for both pollution costs and the distribution of income and the *Genuine Progress Indicator* adjusts for factors such as income distribution, adds factors such as the value of household and volunteer work, and subtracts factors such as the costs of crime and pollution.

*I recommend that Government replaces GDP as a measure of wellbeing with OECD endorsed indicators of wellbeing.*

**Assumption that New Zealand should strive for economic growth.**

The Ministry for the Environment (MFE) FINAL- Zero Carbon Bill - Discussion Document and the Productivity Commission’s 2018 Draft Report both assume that New Zealand is able to and should strive for continued economic growth during the transition from fossil fuels to renewables. A 2% increase in economic activity each year would result in a doubling of economic activity in 35 years’ time. It is highly questionable whether this target should be attempted given the need to reduce greenhouse gases rather than increase them. Some proponents claim that GDP and energy can be decoupled, but there are physical and thermodynamic limits to the extent that decoupling can take place. A transition from fossil fuels to renewable energy will, of course, reduce greenhouse gas emissions, but a major problem is that such a transition will require use of fossil fuels to set up new infrastructure, plant, machinery, vehicles etc. (embodied energy) at the very same time as the need to reduce greenhouse gas emissions. In order to satisfy both requirements, use of fossil fuels will therefore need to be diverted from that of consumption to that of investment. Expectations that business as usual can and will continue during a transition from fossil fuels to renewable energy and that economic growth can and should continue at a time when we need to reduce greenhouse gas emissions are unrealistic.

**Hybrid Emissions Pricing Scheme**

The Productivity Commission’s 2018 Draft Report makes the following Recommendation R4.1 on page 416:

“The Government should reform the NZ Emissions Trading Scheme rather than replace it with a carbon tax. The reforms should provide a good balance between control over unit supply (i.e., an effective emissions cap) and protection against excessive volatility in the price of emission units. The reforms should also provide the institutional and regulatory underpinnings for a credible and efficient market in emission units, as well as transparency and forward guidance to incentivise long-term investments in lower emissions.”

There are clear cut and distinctive advantages and disadvantages of a pure Carbon Tax versus a pure Emissions Trading Scheme (ETS) which are addressed in the preamble and findings that precede R4.1. Given the combination of the preamble and findings followed by the wording of R4.1, the intent of R4.1 seems to seek the advantages of both a Carbon Tax and an ETS. Such a scheme would be a hybrid scheme as described in the public literature and recommended by a number of sources.  The devil of implementation of a hybrid scheme lies within the details. For example, a hybrid scheme can be an ETS which not only caps a limit on emissions, but also sets a minimum price cap which effectively results in a minimum carbon tax.

*I recommend that New Zealand adopts a Hybrid Emissions Pricing Scheme with a cap on emissions and a minimum cap on carbon pricing with full Government control over the auction process.*

**1 July, 2018**

**Today is Earth Day**

Today is Earth Day which prompted me to hunt down a film on Economic Growth for community screening by SCAN (Seniors Climate Action Network based in Dunedin, New Zealand).

I have been aware of the film *"GrowthBusters - Hooked on Growth"* by Dave Gardner for a number of years now, but I hadn't viewed the film as I was already a convert some 40 years ago. Today I paid my US $9.99 and downloaded the 54-minute film in 1080p format. A US $2.99 online version is also available. *“GrowthBusters - Hooked on Growth”* is the best film I have come across so far which challenges economic and population growth. A purchase for an online or download link is [here](https://www.growthbusters.org/watch-growthbusters/) and a purchase of a home use DVD (US $19.99) link is [here](https://www.growthbusters.org/product-category/the-movie/)  A community screening DVD (US $59.99) link is [here](https://www.growthbusters.org/product/growthbusters-dvd-community-screenings/)

**18 July, 2018**

**Copy of Email to Seniors Climate Action Network (SCAN): SCAN Submission on Zero Carbon Bill**

Thank you for the time and effort you have put into our SCAN submission. Well done. I also endorse your submission on behalf of SCAN.

With regards to how best to reduce GHG emissions, I prefer a pure carbon tax on fossil fuels with an immediate full tax and not gradual increases in pricing over a number of years, but in my personal submission I advocated a hybrid scheme.

My reasons for preferring an immediate and full carbon tax on fossil fuels are as follows:

1. We have already delayed far too long in reducing GHG emissions. A gradual reduction in emissions over a number of years will only exacerbate our current situation because the level of GHGs in the atmosphere is cumulative. The severity of climate change can only get worse and even more so with delays in reductions. We risk the impact of runaway climate change and all efforts should be made to reduce GHGs as soon as possible.

2. Climate change is the price our current and future generations will have to confront due to our consumption of fossil fuels which was and still is encouraged by an artificially low price which did not and does not take externalities into account. The longer we delay reducing our GHG emissions, the greater will be costs of climate change in the future.

3. A full carbon tax on fossil fuels will have an immediate impact on reducing current levels of fossil fuel consumption and increasing investment in renewable energy sources and corresponding infrastructure, plant, and machinery.

4. The revenue generated by a full carbon tax can be used for investment in renewable energy and infrastructure etc. and to mitigate the impact of increases in prices for those who are least able to adjust.

5. A full and immediate pure carbon tax on fossil fuels will be disruptive, but New Zealand was able to accommodate and adjust to a tripling in the price of petrol at the pump in the 1970s followed by a doubling in price. The level of a carbon tax can be adjusted so that the level of disruption is no greater than that experienced in the 1970s.

6. The current generations have benefited from the use of fossil fuels and have a moral duty to carry the burden of reducing GHGs as soon as possible. Any unnecessary delays in reducing GHG emissions would transfer that burden and the impact of more severe climate change onto future generations.

My reasons for advocating a hybrid scheme are as follows:

1. In my opinion, New Zealand is highly unlikely to adopt a carbon tax as opposed to an Emissions Trading Scheme (ETS) and any scheme that is adopted and implemented is likely to be a graduated scheme which delays reductions in GHG emissions. One reason why the New Zealand Government is likely to adopt an ETS is well explained in detail in the book *"The SIMPOL Solution"* by John Bunzel and Nick Duffell, 2018 (Amazon.com link here). Essentially, each Government will avoid actions that will put their own country at a disadvantage. The result is that there will be a race to the bottom whereby the least positive action will be implemented by each country.

2. Given that a carbon tax is likely to be rejected and that an ETS is favoured by the Productivity Commission and also the Coalition government, advocating a hybrid scheme is more likely to be considered as an option. A hybrid scheme combines the advantages of a carbon tax and an ETS. If an ETS is adopted, then it will be a coup if a hybrid ETS is implemented. One can only hope.

**21 July, 2018**

**Copy of Email to SCAN: David Fleming & Use of Podcasts for Research & Education**

I really appreciate your links to information about various issues on sustainability and I follow through with each link and subsequent links.

Even though I have collected many GB of publications, videos, and podcasts, David Fleming and his work is new to me. I have downloaded the podcast you recommended which I have yet to listen to (60 minutes) and I have followed through with links to a number of other sources of information which I have included below.

I see that David Fleming advocated a Trading Energy Quotas (TEQ) system to reduce GHG emissions. This is essentially a rationing system which I fully support. I note that [Wise Response](http://wiseresponse.org.nz) advocates James Hansen's Fee & Dividend system which I also fully support. I fully support any system or hybrid system which will be effective in reducing GHG emissions and I do not support any system that will allow a minority to benefit financially at the expense of others or which is ineffective. As to which system will actually be implemented at Government level comes down to politics.

I also see that a film about David Fleming will be released very soon. We need to keep a track on this.

Another thing I noticed is that it took David Fleming 30 years to write his book *"Lean Logic*". This is encouraging at one level in that I despair at times that I have collected information on issues of sustainability at a faster rate that I am able to process. At another level I am aware that I most likely don't have 30 years left to update my 1978 sub-thesis "In Search of Steady State". A few weeks ago, I decided I had collected enough information and that I should now make a start on developing a number of YouTube videos and e-learning courses on various issues of sustainability. But no, I realised there were gaps in my knowledge - Carbon Sequestration by Trees and Soil for example - and I subsequently did a big download of videos and primary publications which I have yet to process and then recommend on my website. From now on I will try and go half and half with my time both continuing to collect primary sources of information and making use of that information by creating educational YouTube videos and interactive e-learning courses.

**Postscript**

I have just finished listening to the podcast on David Fleming ( Ecoshock link [here](https://www.ecoshock.org/2016/12/david-fleming-dark-optimism.html%20 ) ) Doing so has emphasised for me that listening to podcasts for information is not the way to undertake research because podcasts are linear in form and one has to listen to the entire audio and take notes in order to glean information. With a transcript of the podcast, I could have processed the information in 5 to 10 minutes instead of taking 60 minutes by being able to scan read and highlight what I hadn't known before, new concepts that make logical sense and which increases my understanding, and hard data evidence. By all means listening to podcasts is of value for those who wish to do so for pleasure and entertainment, but using this format of information for research purposes is far too time consuming. I see from a recent email that a sustainability organisation is advocating podcasts for educational purposes. The linear format of podcasts for the purpose of education is inferior to books and publications and especially films, video clips, and interactive e-learning courses which include graphics and animation.

**Links of information on David Fleming and Trading Energy Quotas**

The Fleming Policy Centre - link [here](https://www.flemingpolicycentre.org.uk)

Introduction to the David Fleming Film - Link [here](https://vimeo.com/236280442)

Shaun Chamberlin explains TEQs at Parliamentary launch - 1 of 2 - YouTube link [here](https://www.youtube.com/watch?time_continue=7&v=qHJnBQ_m4e0)

Shaun Chamberlin explains TEQs at Parliamentary launch - 2 of 2 - YouTube link [here](https://www.youtube.com/watch?v=YD6Ao3BBN78)

**01 August, 2018**

**Today is Overshoot Day: Earth Overshoot Day website link** [**here**](https://www.overshootday.org)

“Earth Overshoot Day marks the date when humanity’s demand for ecological resources and services in a given year exceeds what Earth can regenerate in that year. We maintain this deficit by liquidating stocks of ecological resources and accumulating waste, primarily carbon dioxide in the atmosphere. Earth Overshoot Day is hosted and calculated by Global Footprint Network, an international think tank that coordinates research, develops methodological standards and provides decision-makers with a menu of tools to help the human economy operate within Earth’s ecological limits.

To determine the date of Earth Overshoot Day for each year, Global Footprint Network calculates the number of days of that year that Earth’s biocapacity suffices to provide for humanity’s Ecological Footprint. The remainder of the year corresponds to global overshoot. Earth Overshoot Day is computed by dividing the planet’s biocapacity (the amount of ecological resources Earth is able to generate that year), by humanity’s Ecological Footprint (humanity’s demand for that year), and multiplying by 365, the number of days in a year:”

**07 August, 2018**

**“Making carbon pricing work for citizens” by Klennert et al. 2018. - Download link** [**here**](https://www.nature.com/articles/s41558-018-0201-2)

The publication “*Making carbon pricing work for citizens*” by Klennert et al. 2018 is worthwhile reading (with effort). When I come across a publication which is highly technical, especially if the paper is based on high level mathematics well beyond my own level of mathematics, I read only the abstract, the introduction, and then the conclusions in order to get value out of the publication. The above publication is well worthwhile reading, but there is little value for me in the conclusion section. By reading and highlighting the entire paper, I have come across valuable information which is relevant and applicable under specific situations, but not necessarily so in general, hence the lack of practical guidance in the conclusion section. The main message of the publication for me is that the "best" carbon pricing system for any country needs to be tailored for that specific country.

I have reservations when I see economists talking about "efficiency". For me, the main criteria of a carbon pricing system are "effectiveness" and equity. Many carbon pricing systems have so far not been effective. This is largely due to the politics of implementation, regardless of whether the carbon pricing system is a Carbon Tax or an Emissions Trading Scheme. I suggest that it is impossible to determine in advance which is the optimal system in terms of effectiveness based on the histories of previous carbon pricing systems and implementation. My training mate in swimming had the saying that "all swimming is good swimming" as opposed to a specific training schedule, and this is true to a certain extent. It is better to make a decent start with a sub-optimal system than to delay while arguing about which is the optimal system. Monitoring the progress of effectiveness and equity and accordingly tweaking the system can be done later on. For me, making a decent start is more important.

**09 August, 2018**

**“*History of oil and gas production from shale in pictures and charts*” by Jeremy Leggett 2018**

I recommend viewing Jeremy Leggett's PowerPoint slide show (114 slides). Very much food for thought when so much reliance is placed by the USA (and England) on fracking. In reality, fracking is not only an environmental disaster, but is also a financial Ponzi operation supported by ever increasing debt. The slide show indicates potential economic disruption when fracking operations inevitably become bankrupt.

A 5.8 MB version in PDF format can be downloaded [here](https://jeremyleggett.net/2018/08/08/history-of-oil-and-gas-production-from-shale-in-pictures-and-charts-why-american-shale-is-heading-for-a-crash-and-fracking-in-the-uk-is-doomed-to-costly-failure/)

A 78 MB PPT file of the slide show can be downloaded [here](https://drive.google.com/drive/folders/1pJlLMT57QZbUP0ZjWf5RMrexzDuanaC2)

The editable PPT file includes all references and Jeremy Leggett has given permission to make free use of the slides.

**27 September, 2018**

**Modified copy of email to SCAN: Limits of Education**

I view climate change as a symptom. The root causes of climate change include population growth, an addiction to economic growth which requires growth in the use of energy (currently fossil fuels), our food production system which relies on fossil fuels in the form of fertilisers, the use of false and misleading indicators of wellbeing (GDP), our monetary system (creation of money is based on debt which is a claim on future resources), and our discounting system. Inequity is also a symptom of root causes. If we are to effectively mitigate the impact of climate change and take appropriate action now, then in my opinion we need to address the root causes.

We act upon what we believe, and rational belief requires understanding. The pathway to understanding is education, but there is a limit to what education can achieve. I have just had a look at the [YouTube video](https://www.youtube.com/watch?v=ASJNU_FyGl4) *"Sea Secrets 2018 James Balog - The Human Element: A Photographer's Journey in the Anthropocene"* which addresses the content and purpose of the film [*"The Human Element"*](http://earthvisioninstitute.org/the-human-element/)*.* The film itself is possibly better screened for audiences in the USA where there is much more division than in New Zealand as to what causes climate change and the degree of impact. The strong message of the video presentation (and I assume also the film) is that belief systems must be based on evidence and that there is an active campaign to distort the truth about climate change.

Solutions include identifying barriers and impediments which block appropriate action, and ways and means of counteracting misinformation. Notwithstanding this, James Balog concedes in the discussion time at the end of the above video presentation that people with a certain hard-wired ideology cannot be persuaded to change their belief system about climate change regardless of any hard evidence. There are also deniers here in New Zealand and Dunedin, and I doubt that SCAN would ever be able to get these people to view any films about climate change regardless of how well we promote a film.

**27 September, 2018**

**Copy of email to SCAN: Recommended YouTube Video**

I have just finished viewing the YouTube video [*"Tenth Anniversary Lehman Brothers at the European Parliament"*](https://www.youtube.com/watch?v=YTTRpz71U7M&feature=youtu.be)presented by Steve Keen. This presentation is one of the best that I have seen that highlights neoclassical economics ignorance of how the economy really works by assuming that banks act as intermediaries of lending instead of actually creating money from debt.

The presentation will not be everyone's cup of tea, but if you are interested in understanding the links between the role of banks, the economy, financial crises, and inequity, then this is a must see. The pressure on the economy to pay off interest on debt is a fundamental driver for continued economic growth. In other publications Steve Keen recommends a Jubilee of debt where debt is written off.

**10 October, 2018**

**Revised Copy of email to SCAN: Links Between Climate Change, Sustainability, and Monetary Policy**

You may have seen on TV the latest IPCC report on climate change. Here are some examples of global coverage of the report:

*"We have 12 years to limit climate change catastrophe, warns UN"* - The Guardian link [here](https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report)

*"Planet has only until 2030 to stem catastrophic climate change, experts warn"* - CNN link [here](https://edition.cnn.com/2018/10/07/world/climate-change-new-ipcc-report-wxc/index.html)

*"Report: we have just 12 years to limit devastating global warming"* - VOX link [here](https://www.vox.com/2018/10/8/17948832/climate-change-global-warming-un-ipcc-report)

The IPCC link to the report is [here](http://www.ipcc.ch/report/sr15/)

All countries need to mitigate the impact of climate change by investing with urgency in alternative sustainable energy sources and infrastructure. A question arises as to how this investment is to be financed. One source of finance is by stopping all subsidies to the fossil fuel industry, divesting from fossil fuels, and then diverting these funds to investments that mitigate the impact of climate change. Another source of finance is by national Reserve Banks issuing interest free credit (money) in the same way that state houses were financed by the New Zealand Government in the late 1930s.

The following is the introduction to the Hansard recording of the parliamentary debate on the 1936 Reserve Bank of New Zealand Amendment Bill (download [here](http://www.insearchofsteadystate.org/downloads/The1936ReserveBankOfNewZealandAmendmentBill-Hansard.pdf)):

"In 1936, the First Labour Government put forward legislation to nationalise New Zealand’s central bank (The Reserve Bank of New Zealand). The legislation also enabled The Reserve Bank to issue credit (money) for the construction of housing and public infrastructure without the need to borrow the money at interest from overseas.

... Thousands of affordable State Houses were built and the unemployed were given work in meaningful jobs.

...The wealth generated for New Zealand allowed for the establishment of a welfare system that became the envy of the world. It also enabled New Zealand to emerge from the great depression sooner and in better economic condition than most countries around the world."

There are solutions as to how to finance with urgency a transition from fossil fuels to sustainable energy sources and infrastructure. We should not hobble ourselves in an age of urgency with defunct monetary policies where government deficits are regarded as a negative to be avoided. Government borrowing of money from private banks which create money and then charge interest on that money is, indeed, a burden on current and future generations, whereas creation of interest free money by the Reserve Bank is not because subsequent government debt does not accrue interest and the Government does not need to pay back debt to itself.

**11 October, 2018**

**Revised Copy of email to SCAN: Richard Heinberg’s Response to IPCC Report**

Richard Heinberg has written an [article](https://psmag.com/environment/2018-ipcc-report-includes-magical-thinking) in the Pacific Standard which is headlined *“The New IPCC Report Offers Climate Solutions That Depend on Magic: To solve the crisis, we'd have to slow growth. And no one wants to admit that.”*

I agree with what Richard Heinberg has written. Expectations of retaining economic growth during a transition from fossil fuels to renewables is unrealistic. Reducing GHGs during a transition where current plant and infrastructure are replaced with renewables over a relatively short time frame is impossible unless resources used to manufacture and maintain current frivolous capital goods are diverted to that required for such a transition. Sacrifices would be inevitable.

Nicholas Stern and Vivid Economics promote "Green Growth" which is a fantasy as described by Richard Heinberg. Do intelligent people promote green economic growth because they truly believe this is possible, or do they promote that which is more palatable to politicians who rely on continued voter support.

Green Growth promotes a transition from fossil fuels to renewables which is an essential step to mitigate the impact of climate change, but what concerns me is that misguided beliefs as to what is possible might result in misguided investments in infrastructure which cannot be maintained in the long term. We have only one shot at this, and the precautionary principle is at play here. All investments in renewable energy sources and infrastructure must be demonstrably and truly sustainable without any hidden subsidies and costs. For example, a transition to electric vehicle will reduce GHGs, but how are our network of roads going to be maintained? Shouldn't our priorities be first on upgrading and electrifying our city-to-city railway network and local light rail systems rather than attempting to retain a road transport system that was possible to construct and maintain using fossil fuels, but which cannot necessarily be maintained when use of fossil fuels is phased out.

**12 October, 2018**

**Revised Copy of email to SCAN: Transport System Priorities**

Transition from fossil fuels to renewables over a short time frame will involve a lot of economic activity. This economic activity will involve use of energy. Despite some claims to the contrary, it is physically impossible to entirely decouple economic activity from the use of energy. Fundamental requirements for survival - food, water, shelter, and transport require the use of energy. In the long run, renewable energy sources and infrastructure will need to sustain itself - manufacturing, maintenance, and replacement - but use of fossil fuels will initially be required to enable a transition from fossil fuels to renewables. Renewables alone cannot bootstrap the transition.

A transition from fossil fuels to renewables without increasing GHGs will require forgoing many current economic activities. Production was diverted to the war effort during WWI and WWII and many sacrifices were made. Is it overly melodramatic to suggest that civilisation currently faces a war-time effort? I liken our response to mitigating the impact of climate change to that of the frog being slowly heated to boiling point in a pot. There is currently indecision as to how serious our situation is and what our appropriate responses should be.

The long-term level of transport that we will be able to sustain will follow after the necessities of food, water, and shelter have first been met. It is sensible to grow food locally. Water sources, including aquifers, need to be protected. Local sustainable forestry would also be sensible to sustain shelter.

It would be a serious mistake to assume that first priorities should be given to retaining our current predominant mode of private transport - cars - by replacing petrol and diesel cars with electric cars. First priority should be given to a city-to-city electrified railway network.

Local transport needs in Dunedin can be largely met by walking and cycling supplemented by public transport. The level of local public transport systems that is possible after primary needs are met is suggested by looking back in history at energy consumption per capita in New Zealand and the type of local public transport systems used back then. Our network of trams and trolley buses served our city well before diesel took over in the 1950s.

Electric buses are more flexible than trams and electric trolley buses which are restricted to overhead lines, but I keep coming back to whether we will be able to sustain a network of roads in the long term without fossil fuels. Without fossil fuels we will have no asphalt and concrete is energy intensive. I suggest that a network of railway tracks for light rail will be far more easily sustained than a network of roads. This applies especially to a city-to-city electrified railway network. We have had roads without asphalt and concrete for centuries, but these roads would not be able to provide a smooth surface for the speed of transport that we are accustomed to. A railway track can provide smooth and high-speed transport at a much lower cost.

A transition will involve change, and basing decisions on what we currently enjoy could result in misguided investments. We can ill afford to make mistakes in investment. The Dunedin Caledonian Grounds running track and cycling velodrome constructed in the late 1950s is an example. The wind-swept site was never suitable for a running track and is now used by the Warehouse and Pak 'n Save. Dunedin constructed a replacement running track at a more suitable location at Logan Park. In the future Dunedin will not be able to afford similar mistakes in investment.

There are many decisions to be made as to what our priorities should be when making a transition from fossil fuels to renewables. These decisions should be based on physical realities and not wishful thinking. Where there is uncertainty, we should apply the precautionary principle.

**14 October, 2018**

**Modified Copy of email to SCAN: Materials for Transport Systems**

In my search for publications on sustainable roading materials, I have come across the following important and useful book which can be downloaded [here](http://www.withbotheyesopen.com/read.php) for free personal use: *"Sustainable materials with both eyes open” by* Julian Allwood and Jonathan Cullen, 2012.

“This evidence-based survey presents a holistic vision of options for a sustainable future by going beyond efficient and clean production to the inclusion of material efficiency and the reduction of demand. Beginning with an all-encompassing examination of the uses of the five most important materials—steel, aluminium, cement, plastic, and paper—this exploration delves into the entire lifecycle of these materials, from smelting and goods manufacture to final recycling. Through evidence drawn from this analysis and real-world commercial enterprises, the study submits creative solutions for achieving manufacturing efficiencies and the same functionality or services using less material, and identifies potential economic outcomes from these scenarios.”

Sub-sections of chapters can be downloaded separately (I assume they can be read on-screen with a browser PDF plugin - my computer is set up to download PDFs) or the entire 356-page book can be downloaded (28 MB) for personal use.

The free PDF book version doesn't have the usual front pages, bibliography section, and index pages which I assume the bought version includes. Each page has a header restriction stating "This electronic copy is provided free for personal use only". The search facility of a PDF reader overcomes the limitation of no index to a certain extent. A PowerPoint summary can also be downloaded (10 MB).

With regards to sustainable roading materials, I have still yet to come across a sustainable smooth roading system suitable for modern high-speed vehicles, but which excludes the use of asphalt and concrete. In the distant future, use of fossil fuels will be far too valuable for use on roads and concrete which makes use of energy intensive cement will be prohibitively expensive. A steel rail transport system still seems to be the lowest energy cost system for local and city-to-city transport networks.

It might well be that New Zealand and other countries will have a larger percentage of electric vehicles by 2050, but an appropriate sustainable transport system must include not only the type of vehicles, but also the surface on which these vehicles run. Private vehicles in the future might well prove to be a luxury society is ill able to afford compared to walking, cycling, and local networks of light rail.

Fossil fuels have enabled concentration of populations in large cities and a rural to urban drift where 80% of populations now live in towns and cities. A reversal in urbanisation might be inevitable in the future with a need for greater independence of industrial production capability within each smaller centre. An electrified city-to-city railway network removes the need for total independence of industrial production and will enable specialisation within different centres.

**15 October, 2018**

**Modified Copy of email to SCAN: Using CO2 to “Recycle” Energy**

VICE Australia has posted a [video](https://www.facebook.com/VICEAustralia/videos/2143022985727922/UzpfSTE1MDcyMjc3Mzc6MTAyMTcwNjExNjIwNzAzNTU/) on Facebook titled *“Why don’t we recycle energy?”* The comments section states "The technology is ready. This is how CO2 could be used to fuel our society”. The video itself states that CO2 in the atmosphere can be converted into high grade fuel which can be used by planes and uses the expression “recycling energy”. For those who are not conversant with this technology, I have attached a peer reviewed international journal publication on turning CO2 into fuels (download from ResearchGate [here](https://www.researchgate.net/publication/44691024_Turning_carbon_dioxide_into_fuel))

The expression "recycling energy" is misleading and, by a process of Chinese whispers, has resulted in a number of Internet sites which claim that technology has solved our energy and climate change problem. No, it has not. Both the use of hydrogen as fuel in engines and fuel processed from CO2 are energy carriers and not energy sources because they both require more energy to create than the energy they deliver. The difference is that when you burn hydrogen in an engine you get water, whereas when you burn CO2 based fuel in an engine you get CO2, carbon monoxide, and even carbon depending on how well the fuel is burned.

It might be better to use CO2 based fuel in planes than using fossil fuels stored in the ground because the process of converting CO2 into fuel and then burning it doesn't add CO2 to the atmosphere, hence the incorrect use of the word "recycling" in the expression “recycling energy”. However, there is a rider. The process of converting CO2 into fuel requires the use of energy and, in addition, the plant and machinery required to enable the process to take place also requires the use of energy and materials. The CO2 based fuel cannot bootstrap itself as the EROI of the fuel is less than 1. If the total system requires the use of fossil fuels, as most likely it does, then CO2 is added to the atmosphere. If the total system uses only electricity generated by renewables (solar panels, wind turbines, hydro etc.), then this use of electricity might be very wasteful. It comes down to opportunity costs - what other uses could that electricity be put to. There is yet another rider. So far renewable energy is unable to bootstrap itself. Manufacturing of solar panels, wind turbines, etc. still require the use of fossil fuels which adds CO2 to the atmosphere. The supply chains which support and enable an alternative energy system need to be examined in order to determine whether the energy system is truly sustainable.

A number of systems can appear to be both feasible and viable when looked at in isolation. A principle of systems dynamics is that second and third etc. surrounding layers of the system need to be considered to determine true long-term viability and sustainability. This is why I have concerns about sustainable roading for transport when many people regard the use of electric vehicles as a solution to mitigate the impact of climate change. Strategies and policies to mitigate the impact of climate change should identify the true long-term energy costs of options and rank them in terms of priority before implementation.

The latest IPCC Report 2018 (download [here](http://www.ipcc.ch/report/sr15/)) has given us a wakeup call and there are many decisions to be made. A systems dynamics viewpoint is needed for each decision, but most publications and books focus on only one or a few aspects which impact on each decision. Comprehensive systems dynamics guides are few and far between. One example is the [book](https://www.amazon.com/Earth-Crossroads-Sustainable-Hartmut-1998-07-28/dp/B01FGIPQSQ/ref=sr_1_1?s=books&ie=UTF8&qid=1539721792&sr=1-1&keywords=%22Earth+at+a+Crossroads%3A+Paths+to+a+Sustainable+Future%22+by+Hartmut+Bossel%2C+1998.) *"Earth at a Crossroads: Paths to a Sustainable Future"* by Hartmut Bossel, 1998. [Vaclav Smil](http://vaclavsmil.com) also provides a similar approach. A purely monetary approach alone to decision-making is inadequate and could lead to wasteful decisions. A dynamic energy and materials systems approach should be included when making decisions that are vital to our future wellbeing.

**15 October, 2018**

**Modified Copy of email to SCAN: The Need to Invest in Renewables ASAP**

The IPCC Report 2018 (download [here](http://www.ipcc.ch/report/sr15/)) focuses on the dynamics of CO2 emissions and the subsequent changes in climate. Mitigation of the impact of climate change obviously involves in reductions in GHGs and the only way to do this and retain some semblance of a modern civilisation in the future is to transition from fossil fuels to renewable energy and to reduce our energy consumption per capita while at the same limiting our population growth.

I have attached the publication *“From Fossil Fuels to Renewable Energies”* by Mediavilla, Miguel, and de Castro on the dynamics of this energy transition which might be of interest to you (download [here](https://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=2ahUKEwjEkdS08oveAhVJrI8KHXM5AeMQFjABegQICRAC&url=http%3A%2F%2Fwww.eis.uva.es%2Fenergiasostenible%2Fwp-content%2Fuploads%2F2011%2F12%2Fartic-enerficcion-atenas08.pdf&usg=AOvVaw3_qytnto8nw6nKeF41psuz)). The message of this publication is the same as that of the most recent IPCC report. There is not only urgency in the need to reduce GHGs now, but also urgency in transitioning to renewables ASAP. The implications are clear - we need to make sacrifices now in order to address both issues and if we do not, then future generations will carry the cost of our inaction in the past and any lack of appropriate response over the next few years.

**17 October, 2018**

**Modified Copy of email to SCAN: Continued Economic Growth is Unfeasible**

I have attached a key peer reviewed international journal publication on the unfeasibility of continued economic growth:

*"More growth? An unfeasible option to overcome critical energy constraints and climate change"* by Capellan-Perez, Mediavilla, de Castro, Carpintero, and Miguel, 2015 (Download from ResearchGate [here](https://www.researchgate.net/publication/275723407_More_growth_An_unfeasible_option_to_overcome_critical_energy_constraints_and_climate_change)). The publication is quite technical, so I have highlighted the relevant introduction and conclusions.

I have listened to the [BBC podcast](https://www.bbc.co.uk/programmes/w3cswkds) *"The Real Story-2018 10 12 - Climate Change Tough Choices"* emailed to us a few days ago. During the podcast I heard one of the participants promote "sustainable growth", an abysmal ignorance of the fundamental principles of sustainability. Promotion of Green Growth - continued economic growth - during a transition from fossil fuels to renewables while at the same time reducing GHGs perpetuates false expectations and muddies important investment decisions which need to be made.

Among many issues and global events that are currently taking place, the latest detailed PowerPoint documentation from Jeremy Leggett on the Ponzi nature of fracking in the USA which will inevitably collapse (download from SlideShare [here](https://www.slideshare.net/jeremyleggett/history-of-oil-and-gas-production-from-shale-in-pictures-and-charts-why-american-shale-is-heading-for-a-crash-and-fracking-in-the-uk-is-doomed-to-costly-failure-16th-october-2018-update?from_action=save)) and the UK Government's nonetheless determination to undertake fracking (The Guardian link [here](https://www.theguardian.com/environment/2018/oct/15/fracking-in-uk-what-is-it-and-why-is-it-controversial)) suggest that we are in for very interesting times. Over the next few years, we will be privileged to be witness to an unfolding of what could be the most pivotal period of human civilisation.

**18 October, 2018**

**Modified Copy of email to SCAN: Plastic Roads and Public Versus Private Transport**

Thanks for directing me to the [website](https://thehimalayantimes.com/opinion/plastic-roads-the-way-forward/) on recycling waste plastic in the construction and maintenance of roads. I have followed up on this lead and I have downloaded a number of magazine articles, research publications, and videos. The following are samples:

*“Can plastic roads help save the planet?”*  - BBC News link [here](https://www.youtube.com/watch?v=cHWYoDKYnQo)

*“Heard about miracle plastic roads - here’s why it is not solution to our plastic problem”* - The News Minute link [here](https://www.thenewsminute.com/article/heard-about-miracle-plastic-roads-heres-why-its-not-solution-our-plastic-problem-36927)

Most news coverage on plastic roads is positive, and the ones that are not address valid environmental concerns about plastic entering our waterways and polluting our atmosphere.

So far, "plastic" roads are a mixture of recycled plastic and bitumen.  A mixture of plastic and bitumen is more durable than asphalt, but this method of disposal of "waste" plastic is but only one method out of many. A number of articles refer to "100% recycling" of plastic. This expression is a misnomer because there is no such thing as 100% recycling except in nature over long time frames. This is because it is too energy cost prohibitive to 100% collect any material that has become dispersed. There are diminishing returns of collection for each additional unit of energy used in any collection process of dispersed material.

A number of comments on websites that promote the use of "waste" plastic in roads suggest that this is a supposed solution to a problem that should not exist in the first place. Instead of rejoicing at what seems to be an easy way of disposing of "waste" plastic, focus should be on reducing the need of disposal in the first place by using alternative to plastics which are biodegradable. Using "waste" plastic in roads should not be regarded as a sustainable recycling of plastic when alternatives to plastics should be used.

In terms of opportunity cost, I query whether "waste" plastic is more valuable for re-use as a chemical substance. Fossil fuels are burned in engines because petrol and diesel are currently so cheap. When fossil fuels are hopefully replaced by renewables, fossil fuels in the ground and "waste" plastic will still remain useful for their chemical composition. When "waste" plastic has eventually been fully utilised as far as possible in the distant future, remaining fossil fuels in the ground might still be mined for use in chemical production even though the energy cost of extraction from the ground would be greater than the energy content of the fossil fuel. There again, it might be energy cheaper to create hydrocarbons by extracting CO2 from the atmosphere using renewable energy to drive the process.

Going back to private electric vehicles and roads together as a transport system, and assuming that "plastic" roads are not only feasible, but also viable, I still maintain that public transport systems should be given priority over the promotion and purchase of private electric vehicles. The first priority, of course, should be investments in renewable energy.

A question arises as to who will do the investing?  Middle class New Zealanders simply do not have sufficient disposable income to purchase solar collectors which feed back into the grid, nonetheless electric vehicles. It is at the community and national level that investments in renewable energy, public transport systems, and other supporting infrastructure are possible. The benefits of these investments will be enjoyed by not only current generations, but also future generations. If these investments are not made, then future generations will carry the costs. The investments which need to be made are social investments which are enjoyed by individuals.

Money is a claim on the use of future resources. In order for society to be able to sustain itself, the use of future resources for the needs of society must and should take precedence over that of the individual. This leads me to suggest that the importation of SUVs and cars with an engine capacity greater than 2.0 litres should be immediately banned. Alternatively, importation of cars with a petrol consumption less than 6.0 litres per 100 km on the open road should be banned. The details can be debated. The principle is that the days of conspicuous consumption are over and society can ill afford to allow the profligate use of fossil fuels to drag down our future prospects of a sustainable society.

In recent weeks petrol taxes in New Zealand have increased and the response of the general public has not been favourable. It is forgotten or unknown by many that in the early 1970s petrol prices at the pump in New Zealand increased threefold overnight as a result of the OPEC trade embargo. A few years later petrol prices at the pump doubled overnight. The New Zealand public's reaction to what is an insignificant recent increase in petrol prices by way of comparison doesn't bode well with the necessary increases in the price of carbon to reduce GHGs. Our current Emissions Trading Scheme is ineffectual and it seems as if a revised ETS instead of a Carbon Tax will be foisted upon us. As I have stated before, whatever carbon pricing system is adopted in New Zealand, an essential feature of the system is that it does actually result in reductions in GHGs, especially in the light of the recent IPCC Report on the need for urgency to reduce GHGs now and not later. The system also needs to be equitable so that those on low incomes are not unduly penalised.

**01 November, 2018**

**Modified Copy of email to SCAN: Dynamics of a Global Transition from Fossil Fuels to Renewables**

I have attached the following peer reviewed international journal publication that addresses the dynamics of a global transition from fossil fuels to renewables while mitigating the impact of Climate Change:

*“Quantifying the narrowing net-energy pathways to a global energy transition”* by Sgouridis, Csala, and Bardi, 2016. (Download [here](http://iopscience.iop.org/article/10.1088/1748-9326/11/9/094009/meta))

The New Zealand Government should pay heed to the results of this publication and similar dynamic studies of energy transition instead of adhering to the recommendations in government commissioned reports published by Vivid Economics. The government commissioned reports do not take into account the physics and dynamics of an energy transition.

A key result of the above Sgouridis et al. publication echoed by a number of peer reviewed publications is that a transition from fossil fuels to renewables should take place not only as soon as possible, but also at a high a rate as possible while still reducing GHGs. Unwarranted delays in transition would make a transition more difficult, if not impossible. Enabling an immediate and rapid transition without increasing GHGs will require diversion from production that bolsters continued use of fossil fuels to that of renewables and allied infrastructure. Reductions in wasteful consumption will also be necessary. Business as usual is not an option.

I have extracted the following quotations in chronological order where "RE" is Renewable Energy and "SET" is Sustainable Energy Transition:

"The early and fuel-switch phase out profiles offer a wider range of easier paths than the delayed transitions primarily because of their lower investment peaks. ...

... In every case, the trajectory of a successful SET consists of a sustained acceleration in the rate of investment in RE. … In all cases, the installation rates should increase by several orders of magnitude within the next three decades. ...

... Importantly, further delays in the rise of RE investments cannot be compensated by subsequent additional acceleration because the decline in net energy from the carbon constrained fossil fuels would be insufficient to power the transition without energetically impoverishing society or exceeding the carbon cap ...

... we need the energy from fossil fuels to transition away from their use. This requirement is analogous to ‘the sower’s strategy’ … the long-established farming practice to save a fraction of the current year’s harvest as seeds for the next. Fossil fuels are finite but we can ‘sow’ what these fuels provide: energy and minerals to create the capital needed for the transition…

... Given the uncertainties in some of the critical parameters, through a mapping of a range of possible trajectories we show that the growth rates of RE installed capacity should continue unabated at above 30% [per year] until at least 2020 and then slowly ease but still remain above 10% almost until 2030. …

…The challenge of a SET before the end of the 21st century under climate constraints is unprecedented in magnitude, scope, and ambition. It is, nonetheless, doable if we adopt a global ‘sower’s strategy’ and proactively invest an appropriate amount of the fossil energy available today into building a sustainable energy future with concrete annual targets. In this respect, the currently observed deceleration in RE deployment (28% growth rate for PV in 2015 from a peak of 75% in 2011 and 17% for wind from a peak of 24.5% in 2010) begins to diverge from early transition trajectories and should be redressed."

**08 November, 2018**

**Modified Copy of email to SCAN: The Need to Ban ALL Drilling for Oil and Gas in New Zealand**

A major issue needs to be addressed - banning additional drilling permits for oil and gas in New Zealand is not enough. See the following:

[*"Greens want Labour to toughen gas ban"*](https://www.newsroom.co.nz/2018/11/05/307755/greens-call-on-government-to-scrap-gas-ban-cop-out) *-* News Room 6 November 2018

Gareth Hughes's Supplementary Order Paper to close the loophole which allows continued offshore drilling was unsuccessful. The Labour Party and NZ First outvoted the Greens.

We need to impress upon the Labour Party, NZ First, and the general public that in order to limit the impact of Climate Change to 1.5 degrees Celsius, 80% of all proven reserves of oil and gas must stay in the ground. I have attached a peer reviewed international journal publication that addresses this issue (download from ResearchGate [here](https://www.researchgate.net/publication/262623769_Un-burnable_Oil_an_Examination_of_Oil_Resource_Utilisation_in_a_Decarbonised_Energy_System)). This conclusion is well covered in the global media as follows:

<https://www.theguardian.com/environment/2015/jan/07/much-worlds-fossil-fuel-reserve-must-stay-buried-prevent-climate-change-study-says>

<https://www.telegraph.co.uk/finance/newsbysector/energy/11331384/Four-fifths-of-global-coal-reserves-must-stay-in-ground-to-tackle-climate-change.html>

<https://www.commonspace.scot/articles/13481/david-carr-not-drill-scotlands-oil-must-stay-ground>

etc. etc.

**10 November, 2018**

**Follow-up on 1 November 2018 Blog on Sustainable Energy Transition & World Food Energy Flows**

Sgouris Sgouridis and Denes Csala have a [website](https://set.csaladen.es/#&description ) on Sustainable Energy Transition which includes Presentations, Articles, & Models. The PowerPoint presentations make for excellent viewing. The source file of their interactive Sustainable Energy Transition model can be downloaded from the website and run using the software AnyLogic Personal Learning Edition (free software, download [here](https://www.anylogic.com/downloads/personal-learning-edition-download/))

Csala has also modelled the EROEI of World Food Energy Flows where the EROEI of food production is the ratio of the energy content of food to the energy required to produce that food. An interactive world map which shows the EROEI of food production for each country scan be viewed at the link [here](https://www.lancaster.ac.uk/staff/csala/food/#&map ).

A number of energy analysis studies made 40 years ago, for example Gerald Leach’s research published in his [book](https://ideas.repec.org/a/eee/wdevel/v5y1977i3p273-274.html) “*Energy and Food Production”,* estimated that the EROEI of pre- and semi-industrial food production systems is much greater than industrial food production. This is because industrial food production relies on fossil fuel-based fertilisation and mechanisation. The EROEI of food production can be estimated at the farm gate, after processing into bread for example, and after arrival at the supermarket. Each process along the supply chain from producer to consumer involves additional fossil fuel energy which reduces the EROEI. In some cases, the EROEI is less than 1.00 which means the consumer is effectively eating oil. It takes more energy to produce the food on the consumer’s plate than the energy content of the food.

The New Zealand EROEI for food production as at 2011 on the World Map shows as being 0.28 while a number of other countries have an EROEI much greater than 1.0. Detailed information (inputs, outputs, imports, exports etc.) for New Zealand can be viewed at the link [here](https://www.lancaster.ac.uk/staff/csala/food/#&30&2011&New-Zealand). The same information for other countries can be accessed from the same website page.

The above study on Food Energy Flows and changes over time shows a trend of a declining EROEI for some countries. A number of counties both export and import food (sometimes the same food) and some countries rely heavily on imported food. As we transition from fossil fuels to renewable energy, local food production which makes use of natural fertilisers will become increasingly more necessary.  Countries with high population densities which rely on imported food are likely to face severe difficulties. It would be ironic if so-called under developed countries which have a pre- or semi-industrial food production system are able to make a smoother sustainable energy transition than more highly industrialised countries.

**24 January, 2019**

**Modified Copy of email to SCAN: Benefits, Disbenefits, Feasibility and Viability of Technology**

Your email comments about the recent commercial for-hire green scooters in Dunedin and technology pressed a few buttons for me. On Tuesday I parked my 670 cc Suzuki Alto up the hill by Moana Pool on Tuesday before our SCAN meeting. (I would seriously consider buying a two-seater lightweight electric vehicle if one were available in New Zealand. One overseas example is the [PEBL](https://www.youtube.com/watch?v=Uos7H4ZFA48&spfreload=10)).

While walking back up Stuart Street to my car after our meeting, I came across a person with a green scooter on the footpath waiting at the next traffic lights intersection. We got talking before the lights turned green for us - we talked about the effort he needed to get to the traffic lights - and when the lights turned green, he continued up Stuart Street with much greater speed than my walking pace by periodically assisting his scooter with a backward push with one leg. The speed he was able to scooter up the steep hill of Stuart Street without undue effort impressed me.

In the 1960s I used to bike from Bayfield High School to Moana Pool each afternoon after school. It took much less effort to push my bike up Stuart Street compared to attempting to cycle up with only 3 gears. Electric motor technology has been around for well over 100 years and the efficiency of electric motors has not improved much since the early 1900s. It was the modern battery technology of the green scooter which made all the difference as to being able to travel up a steep hill without undue effort.

A question arises as to whether production of modern batteries is truly sustainable using only renewable energy sources without fossil fuel subsidies. This is one of many issues which I will address in my book “*In Search of Steady State Revisited”.* Answers to this and similar questions are provided by current cutting-edge research publications in peer reviewed international journals and not in popular books, Internet blogs, and media outlets which are too frequently based on second and third hand etc. unreliable information.

In 1999 I was on sabbatical in Karlsruhe, Germany. My host did not own a car. He used the public electric tram system to travel from home to the university. Whenever he needed to use a car, he used a community owned car by booking his use in advance. In New Zealand most families duplicate purchases of capital goods that are used on a regular but not 24/7 basis - for example lawn mowers etc. A more sustainable approach would be to use a community owned lawnmower on a roster basis. Community owned transport is also more sustainable than privately owned transport. Public transport systems - bus and rail - in New Zealand provide for community use, but the current scales of the networks are limited and public transport networks cannot cater for all needs outside of the networks. New Zealanders currently make duplicate purchases of cars when their need, use, and convenience of transport exceeds that provided by public transport. An increase in the scale of public transport systems using electricity instead of diesel and community ownership rather than private ownership of cars would be more sustainable.

In response to your email, I also have some concerns about electronic technology including the Internet and GPS. Both technologies have positive and negative aspects. For me, the biggest negative aspect of the Internet is the proliferation of misinformation. It takes a great deal of effort to bypass misinformation, identify primary sources, and then establish the reliability of that information. Nonetheless, for me the positives outweigh the negatives so long as there is no censorship of information that erodes civil rights. So far, I am not aware of any such censorship with Internet connections in New Zealand.

Electronic technology enables and offers tangible benefits for society. For example, it is satellite and GPS technology that has enabled and assisted climate change researchers to establish the extent and cause of climate change. Electronic technology provides the potential for disbenefits which include unwarranted surveillance. I understand the only way to ensure GPS location privacy with a mobile is to remove the battery. Electronic technology also enables the machinery of war such as drones and surface to surface and surface to air missiles. I do not have any answers as to how the negatives of electronic technology can be eliminated. For me, the actual benefits of electronic technology outweigh the potential disbenefits.

Once again, there is a question as to whether our current electronic technology can continue to be sustained using only renewable energy sources without fossil fuel subsidies. So far, the answer is not clear cut and certain. There are many feasible paths towards transitioning from a growth and fossil fuel-based society to a steady state and renewable energy-based society, but not all paths are viable in the long run because there are many supply chains with limits which have yet to be fully unravelled. We cannot afford the fallacy that what is feasible is also viable. What is certain is that we all need food, water, and shelter. If we are unable to provide the primary essentials of food and water at a community level, then any hope for long term sustainability is unrealistic. I agree that SCAN is about community-led, bottom-up action. Community leadership and action is also about community preparedness and, without being overly pessimistic, this might be needed sooner than later. Who knows what the future holds for us over the next decade or so?

**26 January, 2019**

**Copy of email to SCAN: Extinction Rebellion’s Petition**

I agree with Pat’s recent article emailed to SCAN members that the role and focus of SCAN has been (is) to raise awareness, bring about hope, share the good news of what is already happening, lobby local and central government, and support the global movement towards resilient communities. I also agree with Pat that SCAN acknowledges and supports those who seek an end to fossil fuels and that there are a number of ways to achieve this.

I have reservations about [Extinction Rebellion’s petition](https://extinctionrebellionchristchurch.wordpress.com/) which states:

“We, the undersigned, demand that the Government enacts legally-binding measures to reduce greenhouse gas emissions to net zero by 2025.” The heading of the petition is “Climate disruption requires the declaration of a state of emergency”.

I have mixed feelings about the petition. I fully support Extinction Rebellion’s appeal for immediate action and I am sympathetic to its *Declaration of Rebellion* that “We hereby declare the bonds of the social contract to be null and void, which the Government has rendered invalid by its continuing failure to act appropriately.” However, the social contract is not just between citizen and government but is also between citizen and citizen. It is the past and current actions of citizens which have contributed to and continue to exacerbate the impact of climate change, and it is the actions of citizens which will mitigate the impact.

Extinction Rebellion’s *Our Demands* state:

*"*The Government must tell the truth about the climate and wider ecological emergency, reverse inconsistent policies and work alongside the media to communicate with citizens." The petition's Open Letter states “Our government needs to tell the truth about this unprecedented challenge to our well-being.”

Does the current New Zealand government hide the truth about climate change? The previous New Zealand government delayed action ([see film about climate change politics in New Zealand](http://www.hotairfilm.co.nz)), but the current New Zealand government has not and does not hide the truth about climate change.

The truth about climate change has been out there for decades, and yet the majority of citizens around the world has failed to take on board this truth and act accordingly. Campaigns of deliberate misinformation has held back the truth, and acknowledgement by any government as to the truth about climate change can help counter this misinformation. The very fact that our current New Zealand government is in the process and about to pass the Zero Carbon Act is an acknowledgement of the truth about climate change and the need for action.

A primary issue is about immediacy and scale of action. I agree with Extinction Rebellion that full-scale action is required now and not later. I have stated so in my submissions to government, Dunedin City Council, and Regional Council, and many times in my personal blogs on my website. So why do I still have reservations about signing Extinction Rebellion’s above petition. It is the call for a declaration of a state of emergency that I baulk at. It is not just the New Zealand Government that needs to act immediately with full scale measures, but it is also New Zealand citizens. I believe that cooperation and trust between citizens and government and between citizens and citizens will be more successful in mitigating the impact of climate change than coercion by government.

Instead of signing a petition that calls for a state of emergency, I would rather sign a petition for the New Zealand Government to immediately set up and promote a national education campaign to bring all New Zealanders up to speed with the need for action and support of change. SCAN and similar groups are already doing this. Government endorsement of these groups will help.

**21 February, 2019**

**Jorgen Randers’s claim that the world population will never reach beyond 9 billion people.**

Jorgen Randers claims that the world population will never reach beyond 9 billion people in his 2014 TEDtalk on [YouTube](https://www.youtube.com/watch?v=73X8R9NrX3w). His projection of the world population which is based on an extrapolation of a continued decline in the world total fertility is both dubious and flawed. I agree that the world population might never reach 9 billion people, but I doubt this would be due entirely to a decline in total fertility alone.

Jorgen Randers is not a demographer with expertise in the field of human population dynamics and his projection runs counter to that of world leading demographers. All projections of population growth are based on a number of tacit and explicit assumptions which might never eventuate. We simply cannot predict what the future holds in store for us. Nonetheless, some assumptions are more realistic than others. Before taking any projection seriously, I would first examine the underlying assumptions. This has not been possible from the above TEDtalk.

The TEDtalk on YouTube is dated 2014, but the talk might have been delivered at an earlier date. There is always a lag before global statistics become available. In 2019 the latest United Nations and World Bank statistics on total fertility are that of 2016 which is a 3-year lag.

Jorgen Randers's graphs are shaded grey on the left-hand side of 2008 and projects forward from that year. The sharp decrease in total fertility at the year 2008 does not tally with global population statistics that would have been available in 2005. There was no sharp decrease in total fertility from 2008 onwards. Yes, total fertility has declined substantially the last 40 years in high-income, middle income, and low-income countries, but since 1995 the decline has slowed down globally and especially in the middle-income countries which have by far the largest population of the three income groups. When graphing the rate of change in total fertility, the trend of a slowdown in the global and middle-income countries decline in fertility since 1993 is very clear. There is no justification for assuming, or whatever, that there was a sharp decrease in total fertility in 2008. Jorgen Randers has extrapolated a non-existent sharp decrease in total fertility into the future. Instead, he should have extrapolated the rate of change in total fertility.

Total fertility tends to drop with prosperity. Prosperity enables better medical care, nutrition, education, and the possibility of a welfare state to care for the elderly. The gap between the prosperity of high-income countries and that of middle-income and low-income countries has increased over the last 40 years.

Prosperity is dependent on access to and use of high-grade energy whether that be fossil fuels or renewable energy. Sustained declines in total fertility are dependent on continued access to and use of high-grade energy. If middle-income and low-income countries do not have their own fossil fuel resources, then they have to bid against high-income countries for those resources on the global market. Increases in the price of fossil fuels will impact more so on the lower-income countries than the high-income countries which are better able to absorb and adapt to such increases.

It is a brave assumption that the prosperity of the middle-income and low-income countries will continue to improve at a rate sufficient to influence total fertility to the extent that the world population never exceeds 9 billion people based on reductions in total fertility alone. It is unlikely that a sufficient global rate of production of fossil fuels is possible to enable a substantially higher per-capita use of fossil fuels in the middle-income and low-income countries, especially when the populations of these countries continue to grow.

If there is to be greater prosperity in the lower-income countries with subsequent reductions in total fertility, a global transition from fossil fuels to renewable energy, and global reductions in greenhouse gas emissions, then the high-income countries will need to divert their use of fossil fuels into renewable energy away from consumption and assist lower-income countries to raise their standard of living while, at the same time, decrease their total use of fossil fuels. Development assistance to lower-income countries should not follow the same course of development as that of the high-income countries which is not sustainable. Further development of lower-income countries should be truly sustainable by using renewable energy and appropriate low-energy use technology.  In the meantime, while all countries continue to use fossil fuels, subsequent CO2 emissions add to the total stock of greenhouse gases in the atmosphere which, in turn, exacerbate climate change which, in turn, impacts on global food production. An [FAO report](http://www.fao.org/3/W5183E/w5183e0b.htm) titled “*The potential effects of climate change on world food production and security”* concludes:

"Although some countries in the temperate zone may reap some benefits from climate change, many countries in the tropical and subtropical zones appear to be more vulnerable. Particular hazards are the possibly increased flooding of low-lying areas, the increased frequency and severity of droughts in semi-arid areas, and potential decreases in attainable crop yields. It happens that the latter countries tend to be the poorest and the least able to make the necessary economic adjustments. Much of the expected change in global climate is due to the past and present activities of the industrial countries; so it is their responsibility to commit themselves to, and to play an active role in, a comprehensive international effort to prepare for the likely consequences."

Jorgen Randers's claim that the world population will never reach beyond 9 billion people might prove to be correct, but not necessarily for the reasons he gives in his TEDtalk.

**24 February, 2019**

**Modified copy of email to SCAN: Decoupling use of resources from the economy**

Some time ago I downloaded the following document:

“*Global material flows and resources productivity”,* UNEP 2016.

While recently writing about population dynamics, I have referred back to this document and it has occurred to me that there are some claims in circulation that countries can and will decouple material use and related environmental impacts from the economy. The above United Nations Environmental Programme (UNEP) document sets the record straight. The document concludes there is a need to decouple material use and environmental impacts from the economy, but does not provide solutions. No doubt efficiencies in the use of resources can be improved, wastage can be avoided, and greater use of recycling can be implemented. However, there are physical and thermodynamic limits to the extent of decoupling. The ability to sufficiently decouple does not automatically follow from the need to decouple.

The following extracts are from the above publication:

"**Consumption has been driving material use**

Globally growth in per capita income and consumption has been the strongest driver of growth in material use, even more important than population growth in recent decades, especially since 2000. Population has continued to contribute to rising material demand but not to the same extent as rising per capita income and the emergence of a new middle class in developing countries. Material efficiency mitigated some of the growth of material use driven by growing population and world economy between 1970 and 1990. Since 1990, there has not been much improvement in global material efficiency, which actually started to decline around 2000.

**The material intensity of the global economy has increased**

The material intensity of the world economy has been increasing for the past decade, driven by the great acceleration that has occurred since the year 2000. Production has shifted from very material-efficient countries to countries that have low material efficiency, resulting in an overall decline in material efficiency. ...global material productivity has declined since about the year 2000 and the global economy now needs more materials per unit of GDP than it did at the turn of the century. What may seem counter-intuitive has been caused by a large shift of economic activity from very material-efficient economies such as Japan, the Republic of Korea and Europe to the much less material-efficient economies of China, India and Southeast Asia.

This has resulted in growing environmental pressure per unit of economic activity and works against the hypothesis of decoupling – achieving more with less – which is so important to the success of global sustainability.

**A new indicator, material footprint of consumption, shows the true impact of wealthy economies on global material use**

This report adopts a new indicator for the material footprint of consumption, which reports the amounts of materials that are required for final demand (consumption and capital investment) in a country or region. This indicator is a good proxy for the material standard of living. The current global systems of production result in a material footprint of Europe’s consumption of around 20 tonnes per capita and a material footprint of North America’s consumption of around 25 tonnes per capita. ...

...The material footprint indicator allows, differently from measures of material extraction and direct material use, the establishment of a landing point for industrial material use. It may well be that industrial metabolism stabilizes at between 20 and 30 tonnes per capita for the current ways in which we build houses and transport infrastructure, how we organize mobility, and deliver manufactured goods, food and energy. Given the fact that the global economy, at today’s level of resource use, is already surpassing some environmental thresholds or planetary boundaries, this shows that the level of well-being achieved in wealthy industrial countries cannot be generalized globally based on the same system of production and consumption. Large improvements in decoupling are needed to service the needs and aspirations of a growing global population in an inclusive way.

**Large gaps in material standard of living persist**

There is still a large gap in the average material standard of living and resulting material footprint between North America and Europe and all other world regions. Annual per capita material footprint for Asia and the Pacific, Latin America and the Caribbean and West Asia is between 9 and 10 tonnes, or half the per capita material footprint of Europe. The EECCA region is following with 7.5 tonnes per capita and Africa, on average, has a material footprint of below 3 tonnes per capita. ...

... The average material footprint of countries with medium levels of human development has grown slowly over the past two decades, reaching 5 tonnes per capita, while material footprint in low HDI countries has been stagnant for the past two decades at 2.5 tonnes per capita. The richest countries consume on average 10 times as many materials as the poorest countries, and twice the world average, which demonstrates very unequal distribution of materials to support the standard of living shows that the low income group of countries will require increasing quantities of materials, per capita, to achieve the sustainable development outcomes the global community aims for.

**A comprehensive database for global material flows**

This report provides a comprehensive understanding of linkages between the world economy, population and material use over four decades (1970–2010) based on a new and authoritative database of global material extraction and a revised database for materials trade. It uses a standard set of material flow accounting indicators as well as new indicators. The data and indicators presented in this report will allow countries and regions to monitor their progress in achieving greater material efficiency through well-designed national policies and regional initiatives. ...

... In this report, the use of materials – society’s metabolism – is interpreted as an environmental pressure. Material use is also closely related to other pressure indicators including waste flows, energy use and carbon emissions, land use and water use. When material use grows, ceteris paribus also the other pressure indicators will increase. Material use is also used as a proxy for environmental impacts that will occur across the whole life cycle of material use from extraction, transformation and consumption to disposal. When material use increases, the environmental, social and economic impacts of material use also see a commensurate rise. Rising material use will result in climate change, higher levels of acidification and eutrophication of soils and water bodies, increased biodiversity loss, more soil erosion and increasing amounts of waste and air pollution. It will also have negative impacts on human health and quality of life. It will ultimately lead to the depletion of certain natural resources and will cause supply shortages for critical materials in the short and medium terms.

While many resources will still be abundantly available over the medium and long terms, pollution and ecosystem degradation and a changing climate will dominate the political debate around using materials more effectively and efficiently. Fast-expanding demand for materials will, however, require very large investments into new extraction and supply infrastructure and will contribute to local conflict over alternative uses of land, water, energy and materials. Such conflict is already pronounced in the energy sector where mining competes with agriculture and urban development in many places.

**Decoupling is the imperative of modern environmental policy**

Decoupling of material use and related environmental impacts from economic growth is a strategy that will be instrumental for ensuring future human well-being based on much lower material throughput. Many regions and countries have embarked on a strategy to substantially increase the material efficiency of their economies and to reduce the overall level of material use. Many countries and regions, including the European Union, Japan and China among others, now have high-level policy frameworks and laws that support resource efficiency and guide investments into green sectors of the economy supported by sustainable consumption and production practices."

Ibrahim Thiaw, United Nations Assistant-Secretary-General and UNEP Deputy Executive Director, wrote the following Foreword to the above publication:

"Natural resources provide the foundation of our lives on Earth. Water, soil, energy, minerals and metals underpin our standards of living. They feed and shelter us, and provide for our material needs throughout our lives.

Yet pressures on these natural resources are mounting. A growing population and heightened world economic demand in the past half century are rapidly depleting these vital resources, inflicting great harm on the natural environment and human health. In our ever-more globalized economy, sustainable management of natural resources will become increasingly important.

When the world’s nations approved the Sustainable Development Goals in 2015, they set out a path towards solving some of these great challenges. These ambitious goals aim to eradicate poverty and sustain economic growth, while maintaining the natural resource base and planetary ecosystems for future generations. Turning the goals into reality will require concerted action by the entire world, developed and developing countries alike. For these reasons, we must better understand where and how natural resources are used. ..."

Ibrahim Thiaw's reference to sustaining economic growth is an oxymoron. Energy Skeptic, Alice Friedemann, correctly points out in her [blog](http://energyskeptic.com/2017/limits-to-growth-2016-united-nations-report-provides-best-evidence-yet/) on the above publication that "The UN doesn’t flat out state there are limits to growth, though they come close when they point out there’s not enough stuff in the world to raise the standard of living for everyone and we appear to be on an unsustainable trajectory (page 5)".

Many researchers in New Zealand government departments are well aware that sustained economic growth is an impossibility just like the authors of the above report who either work for or are commissioned by the United Nations. This awareness also comes out loud and clear in New Zealand government research reports. But too frequently politicians stifle or water down the conclusions of hard evidence-based reports on the environment and the economy. It is politics which will ultimately determine the future course of mitigating climate change and not the science. In a truly democratic society, politicians with integrity vote according to the wishes of their electorate. Politicians with integrity are not swayed by self-serving lobby groups which disregard the public good and politicians with integrity are immune to being influenced by organisations and businesses which make political party donations in expectation of political favours. The United States electoral system is a prime example of an erosion of democracy. In the United States the citizens are also subject to deliberate campaigns of misinformation and legitimate news is accused by its president as being “Fake News”. Our New Zealand citizens needs to be well educated on issues of sustainability and we need to be watchdogs and maintain constant vigilance against similar erosions of democracy and manipulation of news.

**26 February, 2019**

**Copy of email to SCAN: Achieving more with less**

The UNEP 2016 document [*“Global material flows and resources productivity*](http://wedocs.unep.org/handle/20.500.11822/21557)”in my previous email states the following:

"Population has continued to contribute to rising material demand but not to the same extent as rising per capita income and the emergence of a new middle class in developing countries. …The material intensity of the world economy has been increasing for the past decade, driven by the great acceleration that has occurred since the year 2000.

...Production has shifted from very material-efficient countries to countries that have low material efficiency, resulting in an overall decline in material efficiency. ...global material productivity has declined since about the year 2000 and the global economy now needs more materials per unit of GDP than it did at the turn of the century. What may seem counter-intuitive has been caused by a large shift of economic activity from very material-efficient economies such as Japan, the Republic of Korea and Europe to the much less material-efficient economies of China, India and Southeast Asia.

This has resulted in growing environmental pressure per unit of economic activity and works against the hypothesis of decoupling – achieving more with less – which is so important to the success of global sustainability."

Construction of infrastructure and buildings and sustaining that capital requires the use of materials by the tonnage. This is the case in China where an enormous expansion of infrastructure and buildings has taken place in recent decades. In a study of the New Zealand housing stock in 2004 I used a dynamic simulation model to compare the benefit-cost ratio of sustaining a constantly growing housing stock and a stationary housing stock which stays the same size (download [here](http://www.insearchofsteadystate.org/downloads/BenefitCostRatioPerformanceOfHousing-2004.pdf)). I set the growth housing stock to expand at a constant rate of 1.5% per year, the average expansion rate of the New Zealand housing stock over the previous decade which, if continued, would result a doubling in the size of the housing stock every 48 years. The benefits of the housing stock were measured in dwelling service years adjusted for depreciation and the costs were measured in construction units, the resources required to build, refurbish, maintain and replace each dwelling. These units allow comparison with housing stocks in other countries. The benefits of dwelling service years and the costs of construction units can be converted into dollar terms by multiplying by the price of each which respectively give the average yearly rent for services provided by the housing stock per dwelling (excluding the services of land) and the average annual dollar costs of sustaining the housing stock per dwelling.

I estimated that the stationary housing stock would provide a 32.4% higher benefit-cost ratio than the expanding housing stock. The reason why is because the full benefits of investing in the construction of a new dwelling are not immediately realised in the first year after construction. Instead, these benefits are realised over the full service life of each dwelling. But each year more dwellings than the previous year not only replace dwellings that depart from the housing stock in that year, but also add to the size of the housing stock. Full realisation of the benefits of each dwelling recedes into the distant future. With a stationary housing stock, new dwellings replace old dwellings and at any one year the full benefits of the dwellings are enjoyed. This is because the composition of the entire housing stock by age remains the same from year to year and the number of dwellings within each cohort by age within the housing stock mirror the entire history of a single cohort of dwellings which are constructed each year to replace older dwellings.

The same dynamics apply for all expanding and stationary capital stocks and also in Nature. A child while growing rapidly requires more Calories per kilogram of body weight than an adult. Likewise, plants and trees require more nutrients while growing to full maturity. Growth of any form requires more resources than a stationary or climax state. Achieving more with less is impossible if the target is to achieve more.

**27 February, 2019**

**Modified copy of email to SCAN: Patreon support of Steve Keen and Russell Standish**

For those who have a keen interest in economics which is relevant to the real world, I recommend following Professor Steve Keen who wrote the book *“*[*Debunking Economics*](https://www.amazon.com/Debunking-Economics-Revised-Expanded-Dethroned/dp/1848139926/ref=sr_1_1?keywords=debunking+economics&qid=1551378931&s=books&sr=1-1)*”,* 2011. Steve Keen is currently working on injecting energy into economic theory and dynamic economic models. He has also designed a dynamic systems software called [Minsky](http://www.ideaeconomics.org/minsky) which includes Godfrey Tables so that the banking system (creation of money) can be included in dynamic models of the economy. Russell Standish has been working on the Minsky software coding.

I have been a patron of [Steve Keen on Patreon](https://www.patreon.com/ProfSteveKeen) for some time now which gives me access to his podcasts. These podcasts are highly entertaining and informative. Becoming a patron will give access to all podcasts. A few weeks ago, I responded to Steve Keen's call to support further coding of Minsky and I became a patron of [Russell Standish on Patreon](https://www.patreon.com/hpcoder)

There are very few people or organisations that I make monthly donations to. My donations which support Steve Keen and Russell Standish will help bring about a much-needed transition away from the current neoliberal mainstream economics stranglehold on world politics and decision-making back to politics and decision-making based on reality.

**01 March, 2019**

**Modified copy of email to SCAN: 2016 claim by Nicholas Stern that climate change models are overly optimistic**

I agree the title “[*Current Climate Models are Grossly Misleading*](https://www.nature.com/news/economics-current-climate-models-are-grossly-misleading-1.19416)*”* that [Nicholas Stern](https://en.wikipedia.org/wiki/Nicholas_Stern,_Baron_Stern_of_Brentford) chose to use in his 2016 Comment in Nature Online was unfortunate. Unless one reads the Comment as well as the title, it is far too easy for anyone with a predisposition for knee-jerk reactions to assume that climate change is over-hyped. The article in fact states exactly the opposite.

I don't agree with Nicholas Stern's ["green growth"](https://www.theguardian.com/environment/2016/oct/27/10-years-on-from-the-stern-report-a-low-carbon-future-is-the-only-one-available) approach - sustained  economic growth and decoupling of resource use and economic growth are both impossible in the long run. Perhaps Nicholas Stern hopes that economic growth is possible in the short term to alleviate poverty in the less developed countries. However, I do agree entirely with his above Comment about climate change modelling and his recommendation for greater use of stochastic computable general equilibrium (DSGE) models and agent-based models (ABMs).

[Steve Keen](https://en.wikipedia.org/wiki/Steve_Keen) is scathing that most neoliberal economists do not make use of DSGE models. His [Minsky models](http://www.ideaeconomics.org/minsky) are DSGE models which also include the banking sector. The software package called [AnyLogic](https://www.anylogic.com/use-of-simulation/) provides for both DSGE and ABM modelling. A free Personal Edition can be downloaded from [here](https://www.anylogic.com/downloads/personal-learning-edition-download/)

Sgouris Sgouridis, Denes Csala, and Ugo Bardi used Anylogic to model pathways to a global energy transition in 2016. Their peer reviewed publication is called *T*[*he sower’s way: quantifying the narrowing net-energy pathways to a global energy transition.*](https://iopscience.iop.org/article/10.1088/1748-9326/11/9/094009) When Nicholas Stern wrote his Comment in Nature in 2016, researchers of climate change and the need for transition from fossil fuels to renewable energy had been using DSGE models for a number of years.

I agree that "too often economic arguments are embedded in the status quo economic environment" and that "many writers talk about what we can afford to do rather that what we cannot afford not to do." Nicholas Stern states in his Comment that "Economists, in particular, need more help from scientists and engineers to devise models that provide better guidance about what will happen if we succeed or if we fail." Those scientists must include physicists and ecologists. Too many economists have a narrow and blinkered viewpoint of what is important. In times of war, the government deficit pales into insignificance - there is no hesitation to create debt to finance investment in war machines. Governments instead of private banks can create money when necessary for critical investment without any interest charge or, for that matter, need to repay the debt. A debt to oneself never needs to be paid back.

I largely agree with the following comment by a SCAN member about technological development except for the reference about Alice Friedemann:

“I am not one who believes in assuming that technological advancement will necessarily provide the solution but equally I don't buy into the rather close-down discussions that are put forward by people such as Alice Friedemann. She certainly does very useful work but I think is too quick to dismiss (or perhaps just doesn't address) the role of possible advancements in technology, and the potential changes in society.”

For me, Alice Friedemann plays an important role as devil's advocate. Whenever I follow up her comments about what is impossible by reviewing the literature, I find that she is usually right on the mark. It comes down to what is feasible and what is viable. For example, electric planes and electric trucks are feasible - have a look on YouTube for electric [planes](https://www.youtube.com/results?search_query=electric+planes) and [trucks](https://www.youtube.com/results?search_query=electric+trucks) - but are they viable in large scale and in the long run? Energy and mineral analysis studies of critical supply chains need to be made to establish and confirm what is viable in the long run. A sustainable horizon does not stop at 2050 or 2100.

I also agree that in the long run “a better regime needs to be implemented if the human race is to survive.” I have just finished reading a book called “[*Churchill & Orwell: The Fight For Freedom*](https://www.amazon.com/Churchill-Orwell-Freedom-Thomas-Ricks/dp/0143110888/ref=sr_1_fkmrnull_1?keywords=Churchill+%26+Orwell%3A+The+Fight+For+Freedom&qid=1551381503&s=books&sr=1-1-fkmrnull)*”*, by Thomas E. Ricks, 2017. In the back-cover description of the book "Both Churchill and Orwell had the vision and courage to campaign tirelessly against the totalitarian threat from both the left and the right". Not having experienced the hardships before and during WWII, the book is a reminder to me that there are real risks of not only future negative impacts of climate change and peaking of oil and minerals for civilisation to confront, but there are also real risks of an erosion of democracy in the future. As a number of people have been saying for quite a while, it is the politics and not the science that will largely determine our future with regards to the mitigation of climate change. Unlike the early 1980s when there were protests against the Springboks touring New Zealand and many New Zealanders claimed that politics should be kept out of sports, politics is very definitely part and parcel of our attempts to mitigate the impact of climate change.

**01 March, 2019**

**Modified copy of email to SCAN: Could the future be rural?**

Thanks for the link to the publication “[*The Future is Rural: Food System Adaptations to the Greater Simplification*](https://www.postcarbon.org/publications/the-future-is-rural/)*”* by Jason Bradford.

At long last a serious report which echoes the conclusion reached by a group of final year architectural students and included in my 1978 sub-thesis [*In Search of Steady State*](http://www.insearchofsteadystate.org/downloads/InSearchOfSteadyState-1978.pdf). Some 40 years later I still have strong reservations about whether super cities can ever be sustainable. Densification has been possible due to production having a surplus using energy-slaves with a high EROI. The EROI of renewables are a lot less than that of fossil fuels before 1970. Future surpluses under renewable energy will be more limited. Population will continue to grow for many more decades. Growth of towns rather than cities should be encouraged rather than be stifled.

**03 March, 2019**

**Modified copy of email to SCAN: Envisaging a Lifeboat Economy**

When I first saw the title of the article – “[*Envisaging a Lifeboat Economy*](http://www.feasta.org/2019/02/23/anticipating-the-coming-of-troubles-envisaging-a-lifeboat-economy/)*”* -  I immediately thought the article would be in the same vein as the section called “*Living on a Lifeboat”* by Garrett Hardin in the 1977 book “[*Managing the Commons*](https://www.amazon.com/Managing-Commons-Garrett-Hardin/dp/0716704765/ref=sr_1_fkmrnull_2?keywords=managing+the+commons+hardin&qid=1551557012&s=books&sr=1-2-fkmrnull).” Garrett Hardin's article outlined a thesis of lifeboat ethics, a scenario where a lifeboat cannot and should not carry more people beyond its floatation capacity otherwise the lifeboat will overturn and the occupants will be tossed into the ocean alongside others grappling to get into the lifeboat. If the lifeboat occupants don't prevent more people from getting into the lifeboat, then no one is saved.

As an aside, Garret Hardin's 1970s thesis of the inevitability of The Tragedy of the Commons was countered and overturned by Elinor Ostrom, recipient of the Nobel Memorial Prize in Economics. In 1990 Elinor Ostrum published a very readable book on her research called *“*[*Governing the Commons: The Evolution of Institutions for Collective Action*](https://www.amazon.com/Governing-Commons-Evolution-Institutions-Collective/dp/1107569788/ref=sr_1_fkmr0_1?keywords=overning+the+Commons%3A+The+Evolution+of+Institutions+for+Collective+Action%2C&qid=1551557098&s=books&sr=1-1-fkmr0)*”*. In 1978 I followed many others and included Garret Hardin's thesis of inevitability in my sub-thesis “[*In Search of Steady State*](http://www.insearchofsteadystate.org/downloads/InSearchOfSteadyState-1978.pdf)*”*. This was a mistake that I now regret. Back then I hadn’t included counter-arguments based on evidence - in hindsight there were none in the 1970s - and drawn my own conclusions.

When I read the article “*Envisaging a Lifeboat Economy”*, I was uplifted. Yes, some of what was said was grim reading - Brian Davy doesn't pull any punches - but nonetheless cold jolts of reality can be reassuring because it is better to know what can potentially threaten one's safety and survival so that one can be better prepared and more resilient. A question arises - are the threats outlined in the article real or is Bryan Davey exaggerating and merely crying out wolf? From what I have observed and read, the threats he mentions are very real. His article includes positive actions of preparation which are familiar and similar to those advocated in the 1970s.

Brian Davey has also written the 488-page book called “*Credo, Economic Beliefs in a World of Crisis”* which I highly recommend. A copy can be downloaded for free (5 MB) from the Brian Davey’s website [here](http://www.credoeconomics.com/wp-content/uploads/2017/02/credo.pdf)

**03 March, 2019**

**Modified copy of email to SCAN: FEASTA Theory of Change chart on How to get to where you want to**

The top row in the [FEASTA Theory of Change chart](http://www.feasta.org/wp-content/uploads/2019/02/Feasta-theory-of-change-1.png) sets out the issues which need to be addressed in order to  attain “The Ultimate Goal of a vibrant, commons-based and stable global economy within a resilient and healthy global ecosystem.” These issues include:

Debt-free money,

Capping of global carbon,

Provision of a universal basic income,

Use of resource-based taxation Including land value tax,

Improved measurements of progress,

and wide spread adoption of agroecology and soil protection measures.

The title of our group SCAN - Seniors Climate Action Network -suggests that our group is entirely focused on only capping global carbon in order to mitigate the impact of climate change which threatens our well-being in the future. However, the above issues in addition to capping global carbon are also at the heart of our group because if they are not addressed, then they will also threaten our future well-being and hinder, if not delay, mitigation of climate change.

The inclusion of a land value tax in the above chart is of note and especial interest to me. This form of taxation is abhorrent to the one percenters, or the ten percenters for that matter, who own an obscene proportion of the total wealth in any country. A land value tax and other forms of taxation and policies can help promote sustainability of our building stock and reduce unnecessary demolition. I addressed these additional forms of taxation and policies in a conference paper titled “[*Policies and Strategies to Enhance Social Benefits Due to Private Rehabilitation of Buildings*](http://www.insearchofsteadystate.org/downloads/maastriche-conference-2000.pdf)”.

**08 March, 2019**

**Modified copy of email to SCAN: Deep Adaptation: A Map for Navigating Climate Tragedy**

Thank you for drawing attention to Jem Bendell's publication. I have now read Jem Bendell's publication “[*Deep Adaptation: A Map for Navigating Climate Tragedy*](http://www.lifeworth.com/deepadaptation.pdf)*”* and I have viewed his *Deep Adaptation* presentation on YouTube which I recommend viewing. Jem Bendell is a good presenter and what he has to say cannot and should not be too easily dismissed. I have included his publication and video on my website.

No, I didn’t find Jem Bendell's publication or his YouTube presentation to be disturbing because I have already come to more or less the same conclusions. I have processed many key peer-reviewed publications which have inched me towards a conclusion that some form of collapse of civilisation as we now know it is possible before 2050. Preparation for the possibility of a collapse is necessary for our continued survival. I am optimistic there will not be a total collapse of civilisation, however my optimism might prove to be without foundation.

Jem Bendell did a poll on the audience's emotional response to his presentation which would have been shocking bad news for many in the audience. For me it was gratifying that the emotional response of a majority of the audience included *motivation*.

The possibility of a social collapse is very real and yes, I agree that a global social collapse would certainly halt carbon emissions and perhaps, if not already too late, would protect the other species with which we share our planet. Acceptance of the possibility of collapse and subsequent preparation and deep adaptation could be a key to humankind's continued survival. Any long-term survival will require adopting the fundamentals of steady state.

**08 March, 2019**

**Modified copy of email to SCAN: The Emissions Trap**

I have downloaded a recent key publication “*The Energy Emissions Trap”* by Martin Sers & Peter Victor, 2018. The abstract states:

"The requirement to reduce emissions to avoid potentially dangerous climate change implies a dilemma for societies heavily dependent on fossil fuels. Reducing emissions will necessitate the transition from relatively high EROI dispatchable fossil fuels to a combination of relatively low EROI intermittent renewables and geographically limited non-intermittent renewables. As renewable capacity requires energy to construct there is an initial fossil fuel cost to creating new renewable capacity. An insufficiently rapid transition to renewables will imply a scenario in which it is impossible to avoid either transgressing emissions ceilings or facing energy shortages; we term this the energy-emissions trap."

The publication concludes:

"Examining the net energy trajectories for scenarios three and four in Fig. 8, we see a key result of the EETRAP model: the long run consequence of transitioning to renewables with life-cycle energy returns at sufficient pace to avoid transgressing cumulative emissions limits is a decline in the net energy available to society. The magnitude of this decline may be large should the EROI of intermittent renewables decline with increasing share of energy production.  ...

...it is necessary to note that many of the model assumptions are still rather optimistic.

... EETRAP models a world without construction permits, delays, planning, and political setbacks. Realistically, there is a substantial amount of planning and time necessary to construct and install new renewable capacity which is not reflected in the present modelling work.

Therefore, we note that even under relatively ideal conditions facilitating a successful energy transition in the context of declining intermittent renewable EROI may necessitate a large-scale redirection of society's resources to the energy sector. The results of this modelling experiment indicate that it is still possible to transition to renewables, even in the case of declining EROI, though maintaining steady economic growth in such a scenario may not be feasible. However, as economic growth drives increases in emissions, such continued growth may be neither feasible nor desirable if societies take seriously the goal of escaping the energy-emissions trap."

The conclusions of the above publication come as no surprise. What I have found to be more disturbing is information contained in Jeremy Leggett’s latest slide show (115 slides). The sources and citations of Jeremy Leggett's slides are included in the PowerPoint PPT file which can be downloaded [here](https://jeremyleggett.us10.list-manage.com/track/click?u=253b3e1e599cb6ba9a7c2276b&id=6c114a3cfd&e=c35d7242cd). This particular series of slides includes data on the erosion of democracy over time in various countries and the escalation of surveillance and robotization of warmongering.

**28 April, 2019**

**Recommended Book by Vaclav Smil**

I highly recommend Vaclav Smil's 2017 book “*Energy & Civilization: A History” (*609 pages). Amazon.com link [here](https://www.amazon.com/Energy-Civilization-History-MIT-Press/dp/0262035774/ref=sr_1_1?keywords=Energy+%26+Civilization%3A+A+History.&qid=1556406400&s=books&sr=1-1)

Growth simply cannot continue. The only other alternatives are a decline to extinction or a form of steady state. In my web publication “*In Search of Steady State Revisited”* that I am currently writing, I assume that humankind will survive the oncoming transition from a growth society to that of steady state. What is uncertain is the form of transition. It is highly unlikely that a transition from growth to steady state will be smooth without disruption. This is because the world population will continue to increase for a number of decades yet due to population momentum, albeit at a declining rate of growth, while at the same time we will be confronting the impact of the peaking of conventional oil and continued impacts of climate change. Zero carbon cannot and will not be achieved overnight.

One of the sections in my web publication compares the attributes of a growth society to that of a steady state society (link [here](http://www.insearchofsteadystate.org/isossr/SummaryofAttributesofGrowthvsSte.html)). I suggest that the primary directions of change from growth to steady state are already well known. The attribute table is largely based on the same table in my 1978 sub-thesis “*In Search of Steady State”* which summarised research back in the 1970s. What is uncertain is the magnitude of change.

The magnitude of change and the type of steady state that future generations will be able to enjoy depends on the supply chains that are necessary to support a steady state society. Forget monetary estimates. They are useless within the context of establishing what is possible. It is ultimately stocks of energy and matter, flows of energy and matter, and the laws of thermodynamics and nature which will determine what is not only feasible, but also viable. True sustainability is the long-run continuation of supply chains, and the rate of flow of supply chains can be constrained by bottlenecks in just only one link of one chain.

Fully tracking the full extent of supply chains and identifying bottlenecks in order to establish what is possible is extremely complex and difficult. These estimates are constantly undergoing revision as the boundaries of systems are expanded with each more sophisticated study. Nonetheless, back-of-the-envelope estimates can be illuminating, for example, David Mackay provides sobering estimates in his book “*Sustainable Energy Without the Hot Air”* (Amazon.com link [here](https://www.amazon.com/Sustainable-Energy-Without-Hot-Air/dp/0954452933/ref=sr_1_fkmrnull_1?keywords=Sustainable+Energy+Without+the+Hot+Air.&qid=1556409449&s=books&sr=1-1-fkmrnull)).

This brings me back to Vaclav Smil's book “*Energy & Civilization: A History”.* His chapter on food production and fertilisers describes the percentage of nitrogen in organic and human waste-based fertilisers required to replenish necessary nutrients in the soil compared to that provided by artificial fertilisers. The enormous difference has substantial implications for long-term food production in a steady state economy. Research by [Charles Hall](https://www.esf.edu/EFB/hall/) etc. etc. on the EROI of fossil fuels and renewables are also sobering over and above the back-of-the-envelope estimates by David Mackay.

And what do I mean by sobering? The more research that comes out from peer reviewed international refereed journals, the more there are indications that any transition from growth to steady state will be disruptive in that business as usual cannot and will not continue. Transition will involve changes and sacrifices regardless of whether they be willing or not. Peer reviewed research indicates that the longer we delay in taking action to transition from fossil fuels to renewables and the longer we attempt to continue growth and business as usual, the greater will be future disruptions.

Whatever transpires over the next number of decades, localisation and ensuring food production and water supply security is the way to go.

**02 May, 2019**

**Modified copy of email to SCAN: Interview with Dennis Meadows 2017**

I recommend the following YouTube video series - 4 videos, combined total of 43 minutes - which is an interview with Dennis Meadows 45 years after the publication *The Limits to Growth (1972)*.

[Dennis Meadows Interview p1/4](https://www.youtube.com/watch?v=b7lmh5XVRW0) (*The Limits to Growth, Climate Change, Population Growth)*

[Dennis Meadows Interview p2/4](https://www.youtube.com/watch?v=OfmaLnpV1Go) (*Science & Heart to Heart Communication*)

[Dennis Meadows Interview p3/4](https://www.youtube.com/watch?v=AShHb9ME1x8) (*Economics, Globalisation, Responsibilities, Personal Fear*)

[Dennis Meadows Interview p4/4](https://www.youtube.com/watch?v=Dbo6uvJBtZg) (*A 'peaceful collapse' & many revolutions...*)

**03 May, 2019**

**Modified copy of email to SCAN: Netherland Government Report - *Growing within Limits***

In the first interview in the above posting, Dennis Meadows refers to a report by a Dutch Environmental Agency. I have tracked down this report - “*Growing within Limits”* published by the Netherlands Environmental Assessment Agency, 2009. Download link [here](https://www.pbl.nl/en/publications/2009/Growing-within-limits.-A-report-to-the-Global-Assembly-2009-of-the-Club-of-Rome)

The report was presented at the conference celebrating the 40th anniversary of the Club of Rome, in October 2009, in Amsterdam.

The front summary of the report states:

“The risks of the ‘Business-as-usual’ are now well understood and could severely threaten the sustainability of human society.

…What is the problem? Human society will face severe problems when global bio-physical trends in climate change and biodiversity loss continue. Since the publication of “The Limits to Growth’ for the Club of Rome in 1972, it has become increasingly clear that the current trends in the consumption of fossil fuel and other resources, use of land, and pressure on the Earth’s capacity to deal with pollution lead to serious environmental risks. In numerous global environmental assessments published since 1972, more detailed analyses have been made in terms of analysis of specific environmental problems and their magnitude. These studies also show that should historic trends continue in the coming decades, then the world will run into an increasing range of environmental and social tensions. Two top priorities can be derived:

1. ensuring a sustainable energy supply while avoiding climate change

2. preventing terrestrial biodiversity losses while ensuring food security - also in light of possible threats to human development, including poverty."

The above government report acknowledges and accepts there are limits to growth. Far too many government reports on the mitigation of climate change are based on an underlying premise that business as usual can and should continue as much as possible. The subsequent goal of such reports is to continue maximising growth in GDP. The goal should be to maximise wellbeing within ecological constraints rather than maximise GDP which is a widely acknowledged inadequate indicator of wellbeing. Vivid Economics publications commissioned by governments are prime examples of publications which essentially promote economic growth in GDP. These reports either ignore or are unaware that climate change is a symptom and result of excessive growth in population and material consumption which, together, now exceeds the carrying capacity of our planet Earth.

Successful mitigation of climate change depends on first acknowledging and accepting that growth in population and material consumption needs to be curbed and then adopting appropriate policies. If a person has dislocated his shoulder, then treating the symptom of pain with pain killers will not alone discontinue the pain. The cause and source of the pain needs to be addressed in order to fully cure the patient.

**15 May, 2019**

**Modified copy of email to SCAN: Prevarication and back-pedalling by United Nations Secretary General in interview on Climate Change**

I recommend viewing Monday night's Q&A with Jack Tame interviewing the United Nations Secretary General (UNSG), Antonio Guterres, on climate change and, in particular, New Zealand's forthcoming Zero Carbon Amendment Bill. If you missed it, then you can see it on TV on Demand 30 minutes in: link [here](https://www.tvnz.co.nz/shows/q-and-a/episodes/s2019-e11)

At the start of the interview the UNSG came on strong about the lack of action and commitment by world governments, but prevaricated and back-pedalled when Jack Tame asked some hard questions on his response to New Zealand's commitment. For me, the UNSG came across as being of the same cloth that he was critical of. He wants to be seen doing his job as UNSG, but when it comes to the crunch, he lacks the grit to truly get the message across. Diplomacy be damned. His role as UNSG is to provide clear directions as to what governments should do to mitigate the impact of climate change. It is a shame that our former New Zealand Prime Minister, Helen Clark, missed out on being elected UNSG. Congratulations to Jack Tame for asking the hard questions and shame on Antonio Guterres for not giving straight answers, especially given his opening statements.

**27 May, 2019**

**Steve Keen and the Role of Energy in Production**

Professor Steve Keen is a renegade economist who is highly critical of neoclassical economics as being inconsistent, unscientific, and empirically unsupported. Steve Keen would be regarded as an anathema to most current economic departments. His book “[*Debunking Economics: The Naked Emperor Dethroned?*](https://tinyurl.com/yxv8b7mq)”, revised and expanded 2nd edition 2011 is well worthwhile reading.

Steve Keen's major contribution to economics so far has been on mathematical modelling and simulation of financial instability based on Hyman Minsky's financial instability hypothesis. He designed the simulation software called "[*Minsky*](http://www.ideaeconomics.org/minsky)" to help him do so.

Steve Keen has addressed the role of energy in production for a number of years and I highly recommend viewing the following YouTube videos of two of his lectures:

*“Value theory, thermodynamics and dialectic”*' - YouTube link [here](https://www.youtube.com/watch?v=f8KhlejNwyU)

“*The Role of Energy in Production (with discussion*)” -YouTube link [here](https://www.youtube.com/watch?v=sOjrTQZBmMM)

For a list of Steve Keen’s videos – Link [here](http://cd-asl.org/society/steve-keen-videos.html)

For a list of Steve Keen’s lectures – Link [here](https://www.patreon.com/ProfSteveKeen/posts?tag=Lectures)

One of Steve Keen’s recent international refereed journal publications is “[*A Note on the Role of Energy in Production*](https://ideas.repec.org/a/eee/ecolec/v157y2019icp40-46.html)”, 2019 co-authored with Robert Ayres and Russell Standish.

**31 May, 2019**

**Modified copy of email to SCAN: "*Trust WHO: The Business of Global Health*" documentary**

Aljazeera recently screened the documentary "*Trust WHO: The Business of Global Health*" on its TV channel which I had recorded and viewed last night. I recommend viewing this documentary.

The documentary investigates the lack of independence of the World Health Organisation (WHO) due to influence by corporations and the drug industry etc. which now largely fund WHO. The closing 5 minutes of the documentary includes a damning confirmation of lack of independence by a senior WHO official at question time during a WHO conference.

An especially important part of the documentary for me was its reference to the impact of radiation following the Chernobyl and Fukushima nuclear power station disasters. A number of years ago I saw claims on the Internet that there were only 50 deaths dues to Chernobyl which, at the time, didn't sound right to me. The WHO had/has perpetuated this misinformation on its website. This documentary sets the record straight.

Usually, Aljazeera screened documentaries can be viewed from its website, but not in this case. The documentary can be viewed on a paid basis (rental or buy) from a number of organisations. I have opted for a buy option of US $10 (2.5 GB MP4) from [Vimeo](https://vimeo.com/ondemand/trustwho) to add to my collections of videos on issues of sustainability.

**31 May, 2019**

**Modified copy of email to SCAN: The Long-term Viability of Renewable Energy Systems**

Over the past week I have processed a number of publications which address the long-term viability of renewable energy systems. Mitigation of human induced climate change requires a reduction to zero emissions of greenhouse gases caused by the combustion of fossil fuels. In the absence of using fossil fuels as an energy source, we will still need to use energy to maintain an acceptable standard of living. Although renewable energy and nuclear energy are feasible alternative energy sources, they are not necessarily viable in the long-term. Production of any technology relies on a web of supply chains which are complex and difficult to unravel. Failure in any one link in any of the supply chains can result in the difference between short-term feasibility of a technology and long-term sustainable viability. It is critical that the long-term sustainable viability of any renewable energy source be clearly established without doubt before investing materials and energy in large scale transitions from fossil fuels to renewable energy. The history of biofuels stand testimony to previous foolhardy expectations based on premature and inadequate energy analyses.

In 2016 Simon Davidsson completed a PhD thesis titled *“Natural Resources: Growth Rates and Resource Flows for Low-carbon Systems”* which can be downloaded from the Uppsala University website - link [here](http://uu.diva-portal.org/smash/record.jsf?pid=diva2%3A955725&dswid=-202). Davidsson’s 50-page PhD thesis is a summary of five of his co-authored and peer reviewed publications published in international refereed journals. These journal publications cover the following topics

Resource constraints for wind energy.

Material requirements and availability for deployment of photovoltaics.

A review of life cycle assessments on wind energy systems.

Lithium availability and future production outlooks for battery storage.

Phosphate rock production and depletion related to global food production.

Davidsson’s conclusions in his PhD thesis concur with a number of peer reviewed publications that explicitly address the long-term viability of renewable energy. There are problems and uncertainties of long-term viability which simply cannot and should not be swept under the rug and ignored. Over the next few weeks, I will document a number of key publications which address these problems and uncertainties in my web publication “*In Search of Steady State Revisited”.*

Regardless of problems and uncertainties, the need to mitigate the impact of human induced climate change still remains. Relying on carbon pricing alone as a way to reduce greenhouse gas emissions will not necessarily bring about expected reductions. I am now leaning towards a per-capita rationing of the purchase of petrol and diesel in New Zealand. This per-capita rationing would decline annually to zero over a number of years. Each year the unused rationing rights could be sold on the market with a percentage of the sale price going to the seller as a reward and a percentage going into a national fund reserved for investment in transitional infrastructure. For me, one highlight of our recent national budget is the allocation of $1 billion towards upgrading KiwiRail. Our railway infrastructure certainly needs to be upgraded and extended, and replacement of wagons would be a sound investment for the future. I am not so keen on replacing our current diesel locomotives with more of the same. A fully electrical railway network is ultimately the sustainable way forward.

**01 June, 2019**

**Modified copy of email to SCAN: Reply to question and comments on my email on The Long-term Viability of Renewable Energy Systems**

Thank you for your question and comments. Much appreciated. Most of the time I play my own role of devil's advocate.

**Preamble**

First and foremost, when I refer to long-term sustainability, I mean a time frame when renewable energy sources need to replace themselves repeatedly for centuries into the future. The focus of my web publication *In Search of Steady State Revisited* is on the direction of change required to achieve steady state. Growth cannot continue and steady state is the only way forward for our species to survive in millennia to come. Magnitudes of change are and will continue to be uncertain. A transition will happen over the next 100 years, whatever form that might be, and I assume in my web publication that the transition will eventually result in steady state. All this is covered in more detail in the completed sections of my web publication.

We have an immediate problem which is the mitigation of human-induced climate change. I am all in favour of stop gap measures which result in lower greenhouse gas emissions, even though they might not prove to be sustainable in the long-term.

All current manufacturing of renewable energy sources (wind and PV etc.) rely on the use of fossil fuels. Dynamic flow studies of the magnitude of fossil fuels required to enable a full transition from fossil fuels to renewable energy indicate that if business as usual should continue - i.e. continued growth in GDP, i.e. an increase in economic activity, i.e. an increase in the use of energy because there are limits to decoupling energy from GDP - then the per-capita use of fossil fuels will increase yet again for a number of decades before renewable energy is able to take over. There would also be additional increases per-capita in the use of fossil fuels should the rich countries assist the poor countries to achieve the same standard of living and technology. The following are two examples of dynamic studies of energy flows:

"The transition towards renewable energy, physical limits & temporal conditions" by de Castro et al. 2013

"*The sower's way: quantifying the narrowing net-energy pathways to a global energy transition*" by Sgouridis et.al 2016

Business as usual cannot continue if we are to be successful in mitigating the impact of human induced climate change and reach zero carbon targets by 2050 or earlier. There needs to be an immediate major diversion of investment away from fossil fuels to that of renewable energy. The scale of investment in renewable energy required also means that reductions in the total use of fossil fuels during the transition will not happen unless there are also major reductions in the scale of unnecessary consumption and elimination of all fossil fuel-based investments.

There is a business-as-usual mentality by many people when it comes to visions of transition. One example is the replacement of fossil fuel cars with electric cars. A total rethink is warranted when it comes to transportation of people and goods. Current electric cars are more of the same in terms of size and weight and there are strong signals that rare earth metals used in battery technology are scarce. Reliance on electric cars for private transport could well prove to be an expensive stop-gap measure. In my opinion, focus and investment should be on public transport rather than private transport and especially on electrifying our national railway network.

The more peer reviewed publications that I read, the more I am coming to the conclusion that we need to reduce our excessive consumption of materials. An increase in recycling will do much to help, but there are limits. 100% recycling of materials is physically and thermodynamically impossible except in ecological systems where dispersal of minerals is an advantage. Human technology requires a concentration of minerals and this requires energy. If recycling were 99% efficient and there were no progressive increases in energy costs to do so (there would be in practice), then it would take 100 cycles for originally mined minerals to reduce to 37% of its former magnitude with 63% dissipated and too energy costly to recycle compared to mining. In the meantime, continued mining would be necessary to maintain a constant flow of materials and continued mining would become progressively more and energy expensive. Eventually the energy costs of mining would be the same as that of recycling. By that time, if not before, the energy costs of both mining and recycling would be cost prohibitive given that energy would be more urgently needed elsewhere in the economy. I referred to Frank Trentmann's book "The Empire of Things" in a recent email to SCAN members. His book on the history of consumption and his chapter on recycling makes for absorbing reading. We are nowhere near a 99% level of recycling. Even 50% recycling for many products would be an achievement. The days of Thorstein Veblen's "Conspicuous Consumption" are over.  My chapter on Excessive Material Consumption is the next chapter that I am writing after identifying key publications on key issues of sustainability.

Preamble over. I will now address your question and comments on my 31 May email to SCAN. On 31 May I posted a modified version of that email on my personal blog below.

1. Which publications?

There are numerous websites and publications on the Internet and books that indicate a rosy transition from fossil fuels to renewable energy. It is these publications that the general public tend to read and believe. To identify these publications, all one needs to do is a Google search.

In a serious study of issues of sustainability, the sources of much more reliable information are contained in peer reviewed international journal publications, and the leading authors are much more difficult to track down when interlinked issues of sustainability cover a diverse range of research outside of one's own area of expertise.

There is currently a growing groundswell in the research community for more sophisticated and in-depth studies of the viability of renewable energy technology. The following publications are an example of the current debate:

"*Burden of proof: A comprehensive review of the feasibility of 100% renewable electricity systems"* by Heard et al., 2017.

"*Response to Burden of proof: A comprehensive review of the feasibility of 100% renewable electricity systems*" by Brown et. al. 2018

Previous EROI studies have been found to be deficient in terms of the boundaries of the studies and there is now greater awareness of the need for energy and mass flow studies to establish the scarcity of materials. Davidsson's PhD publication which I referred to with a link in my 31 May personal blog below provides an excellent summary of the problems. I have downloaded the five publications that Davidsson's PhD thesis is based on and I have waded my way through three of them so far. One of these publications spells out in far greater detail the extent of deficiencies in previous EROI studies of wind energy.  Only a minority of publications include supply chain consequences in their publications and these are not in-depth studies of potential bottlenecks.

2. Yes, supply chains can be complex.  There will undoubtedly be challenges in maintaining technology in a carbon constrained future.  That doesn't necessarily mean it's impossible.

My focus is on establishing what these challenges are in advance so that we can prepare for them.

The extent we are currently reliant on a fossil fuel economy is well established, but there are gaps in our knowledge as to the extent we are dependent on computer technology and potential bottlenecks in the supply of minerals required for continued manufacturing of computers and IT networks. Fred Cottrell in his 1955 book "Energy and Society: The Relation Between Energy, Social Change, and Economic Development" refers to an energy field in society which limits the structure and form of human settlements. Recent studies of the same ilk are looking at this issue in terms of the minimum EROI of energy sources required to sustain a particular level of technology. The following is one of those studies:

"*Energy, EROI, & the quality of life*", by Hall et al, 2014

Computer technology is highly sophisticated and would require a higher EROI compared to that to sustain a society that uses mechanical calculators.

3. Well, no.  We don't have time to sit on our hands while academics argue about whether wind turbines will be maintainable or replaceable long term.  If we put in wind turbines that last 20 years, it doesn't really matter if we can replace them or not in 20 years.  If we can, great.  If we can't, at least we've bought ourselves 20 years to power down with lower emissions.

I agree and I have addressed this comment in my preamble.

4. It was always pretty obvious that biofuel was going to compete with food production and wild places.  Wind on the other hand (and unlike solar) can co-exist with agriculture.  While there are limits and there may be supply chain challenges in future, it is currently one of the few viable sources of low carbon energy.

It wasn't always obvious that biofuel was going to compete with food production. In the 1970s and early 1980s biofuel was regarded as the answer to fossil fuels. Just as well we didn't invest heavily in this technology back then. This decision wasn't due to prudence or forethought. Declining prices in fossil fuels in the 1980s resulted in lack of government interest and resolve to fully transition from fossil fuels to renewable energy of any form.

5. Fundamentally I think we should focus both on reducing energy demand and renewables, particularly wind.  I can't see anything fundamental that will be problematic with wind power medium term except the limits of available energy, which we are a long way away from in NZ.

I agree we should focus on reducing energy demand, but we might differ on the emphasis on how we do this. The way I see it is that climate change is a symptom caused by population growth and excessive material consumption. There is little we can do about population growth over the next number of decades due to population momentum (see my chapter on Population Dynamics in my web publication), but a lot we can do about reducing material consumption which currently results in combustion of fossil fuels and greenhouse gas emissions to the atmosphere.

First and foremost, we need to change the current mindset that a growth economy is a superior economy. Government certainly needs to take action to help mitigate the impact of climate change, but it is also action at the community and individual level that is needed. Business as usual cannot and should not continue, but this also applies at the individual level. The big question is will we as individuals take steps to voluntarily reduce our own consumption or will it be necessary for government to intercede and enforce rationing. If greenhouse gas emissions should not decline by the end of 2030 (or earlier) and the impact of climate change consequently accelerates, government should step in and enforce rationing. But it is us who vote in governments, and there will be opposing camps in society as to what steps we should take to mitigate the impact of climate change. This comes back to education and changing the mindset that a growth economy is a superior economy. Our government's recent delivery of its Wellness Budget is a step in the right direction to educate the public that Wellness should be the goal. The next step should be to help educate the public understand that wellness does not necessarily require increases in GDP.

Wind power in New Zealand seems to be a goer, and so too with geothermal. We are blessed living in New Zealand which already generates a high proportion of its electricity using renewable energy sources. I would like to see a subsequent electrification of our national railway network, electric public transport in every town and city, increases in the number of cycleways, and an increase in the power of electric bikes from a limit of 300 watts to 1 Kilowatt to handle the hills of Dunedin. I would also like to see an immediate ban on imports of frivolous SUVs and a progressive tax on imported cars based on their fuel consumption.

**06 June, 2019**

**Recommended Slideshow by Jeremy Leggett**

I recommend viewing the following slideshow by Jeremy Leggett (62 slides, 21 MB download, with sources):

*190604 The shortfall in progress on the provision of affordable and clean energy for all by 20130 (SDG7) and its eminent fixability.* Download link [here](https://drive.google.com/drive/folders/1pJlLMT57QZbUP0ZjWf5RMrexzDuanaC2)

The slideshow demonstrates that it is not only misinformation, apathy by the general public, and inaction by governments that is holding back a transition from fossil fuels to renewables.

**06 June, 2019**

**Recommended Documentary: *Ecosystem Alert***

I recommend viewing the 25-minute documentary “*Ecosystem Alert: Protecting Lands in Peril”* which can be viewed on YouTube - Link [here](https://www.youtube.com/watch?v=OEySIxCvSgM)

The Aljazeera website has more information about the documentary - Link [here](https://www.aljazeera.com/programmes/earthrise/2019/05/ecosystem-alert-protecting-lands-peril-190523082552039.html)

What was particularly striking about the documentary for me was the example of the generally unknown supply chain linkage between the large-scale felling of forests and the garment industry:

"**Forest-free Fashion**

The fashion industry is worth $1.7 trillion. Every year, textile manufacturers make billions of garments which might only be worn once or twice before ending up in landfill.

This so-called fast fashion is incredibly resource-intensive and one of the key drivers of biodiversity loss and deforestation.

Viscose and rayon are highly prized fabrics and demand for them is on the rise. But these materials have a dark secret. Millions of primary forest trees, thousands of years old and irreplaceable, are being used to create the pulp, which makes everything from T-shirts to jeans.

The number of trees and forests destroyed not only devastates the surrounding land but also releases tonnes of carbon back into the atmosphere."

**09 June, 2019**

**Modified copy of email to SCAN: Recommended Book on Climate Change**

I recommend the book “[*Priority One: Together We Can Beat Global Warming*](https://www.amazon.com/Priority-One-Together-Global-Warming/dp/0979479932/ref=sr_1_1?keywords=Priority+one+Yeomans&qid=1559944736&s=books&sr=1-1)*”* by Allan Yeomans, 2007 (soft cover edition). My 2005 hard cover edition is A4 size, 492 pages.

Amazon.com describes the book as follows:

"We can do better than just slow down global warming. We can fix it. This book shows how. Increasing the organic matter in the world's soils is the only practical and cost-effective way to stop the worldwide catastrophe of global warming. By switching to sustainable energy sources that don't add carbon to the atmosphere, we can keep global warming stopped. Yet these proven solutions are poorly understood, scattered among specialties, and surrounded by confusion and conflict. Priority One shows how to combine these proven solutions so we can stabilize the world's climate, bolster lagging economies, and enhance human health. But we need to act now, before this one-time opportunity is gone."

I have found Allan Yeomans’s book to be well written and far-encompassing. What sets his book apart from other books on climate change is “*Chapter 9: Strategies, Guidelines, Tactics and Ploys for Marketing and Promoting Fossil Fuels and Petro-Chemical Products”* pages 175-327. The First Strategy titled “*Oil Companies and Countries Lobby to Influence World Decisions, Intergovernmental Panels and International Treaties”* from pages 182 to 196 makes for absorbing reading on the history of the Kyoto Protocol up until 2005. The remainder of Chapter 9 describes a number of devious and deceptive strategies adopted by the oil industry which would be under the radar of most people.

I own a 654-page book called “*Building Pathology: Deterioration, Diagnostics, and Intervention”* by Samuel Harris, 2001.  This book lacks any references, but the book well compensates by being very useful. Allan Yeomans's book contains very few references to sources of information, but his book does provide detailed and carefully crafted arguments for each claim and advocacy which enables double checking as to the reliability and accuracy of the bases of his arguments.

Although I do not agree with everything that Allan Yeomans claims or advocates in his book (he is a strong advocate of nuclear energy – I still have reservations based on risk versus benefits and feasibility versus viability), whatever he writes is thorough and thought provoking.

**12 June, 2019**

**Modified copy of email to SCAN: Recommended Documentary - "*Pumped Dry - The Global Crisis of Vanishing Groundwate****r*"

I recommend viewing the 64-minute documentary “*Pumped Dry: The Global Crisis of Vanishing Groundwater”* on [YouTube](https://www.youtube.com/watch?v=RjsThobgq7Q).

In the last few months, I have focused on collecting and processing information on the supply chains and potential bottlenecks of the technology, materials, and energy required to provide long-term sustainable and alternative energy supply systems to replace fossil fuels. This focus might seem to be esoteric to some but, in my opinion, it is important to establish what is possible for future generations, rather than what our current generation wishes for based on our own recent history and personal experience.

There are supply chains that are more immediate which are related to Maslow's hierarchy of needs starting with our physiological needs of food, water, warmth, and shelter. Maslow's listing of physiological needs is actually in the wrong order of priority. Water comes before food. We can survive for weeks without food, but only a few days without water, and the supply chains of food are totally dependent on water. This is why I recommend viewing the above documentary.

It is while I was watching the above documentary that I realised that taking on board information by way of written words alone does not convey the full impact of the message. An emotional side of the message is equally important. The above documentary has both import and impact and the issue of water rights of aquifers applies to all countries, including my own country of New Zealand.

**19 June, 2019**

**Modified copy of email to SCAN: Climate Change Action Needed at Personal Level**

Climate change is a symptom caused by population growth and growth in the per-capita consumption of materials and energy. All consumption using fossil fuels results in greenhouse gas emissions and there are physical and thermodynamic limits to the extent that the economy and wellbeing can be decoupled from energy. If all nations were to adopt a Zero Population Growth (ZPG) policy and births immediately were to equal deaths, then the world population would continue to grow due to population momentum until it stabilised decades later this century. In order to reduce greenhouse gas emissions, we therefore need to reduce our per capita consumption of materials and energy. There have been delays in climate change action by most countries and the global rate of greenhouse gas emissions has subsequently yet to decline. The news media tends to focus on activists demanding action at the government level while glossing over the need for families and individuals to undertake action at a personal level. It is the inaction of not only governments and local authorities, but also families and individuals that has contributed to climate change. Changes in the consumption behaviour by families and individuals are needed to help mitigate the impact of climate change. Even though our current economic and government systems restrict what can be easily changed - examples include provision of public transport, water, electricity, and transport and communication networks - there are nonetheless many changes in actions that families and individuals can undertake.

Families and individuals need to realise that action starts at home. Action means being more frugal and accepting of the principles of sufficiency. The most effective ways of reducing greenhouses gases at the family and individual level have been well known for decades, and these actions can be listed in the order of Maslow's hierarchy of needs, starting with physiological needs.

**Food & water**

Methane gas belched out to the atmosphere by ruminants is initially more potent than CO2 and contributes about 50% of global greenhouse gas equivalents. The most effective and immediate way for families and individuals to reduce greenhouse gas emissions is to eat less meat or no meat at all. There are alternative plants substitutes which can provide necessary proteins and the minerals of milk. Many crops fed to animals are crops that can be eaten directly by humans. Land used for grazing can be planted back into forests which can absorb and store more CO2 than grass.

Where possible, we should grow our own vegetables or alternatively buy local food grown using permaculture methods instead of energy intensive fertilisers. Food and the use of water are interlinked. All crops are dependent on water and some crops use more water than others. Crops which use less water should be given priority where water is scarce and irrigation makes use of aquifers. We should also avoid processed food and cook our own food using local staples. In doing we will reduce the need for packaging.

About 30% of food is wasted in the global supply chain from the farm to the waste bucket at home. We should buy only what we need so as to avoid wasting food. The only food products that we don’t eat should be potato peelings etc. which should be returned to a compost heap for growing more food.

**Warmth and shelter**

Clothing is the most efficient way to keep warm. We should not heat a room or a house and then take off our jerseys and put our thermals into a drawer. 180 C is a sufficient temperature for humans and over 200 C is excessive. It is far too easy to accommodate a higher temperature than necessary by removing clothing.

Before heating a home on a limited budget, we should make sure our home is well insulated. Insulation of housing became mandatory in 1979 and these standards have been raised in subsequent years. Most homes constructed in New Zealand before 1979 have no insulation in the walls, but the ceilings can be easily insulated where there is a roof space and likewise under-the-floor insulation can be installed where there is a crawl space.

We should question whether it is necessary to heat our entire house. Heating only the rooms we occupy is the way to go if we are on a limited budget. By all means we should buy a heat pump if we can afford one - heat pumps use 25% of the energy of a bar heater to heat a room to the same level. Ideally, houses should make use of the sun instead of needing additional heating.  We should not assume our electricity bills will come down as a result of using a heat pump. Families which have shifted over to using a heat pump frequently finish up with the same previous electricity bills due to what is called the rebound effect because they adopt a higher thermal comfort level in the entire house and a higher and sometime excessive temperature on the same electricity budget.

**Transport**

We should use public transport more often as this is the most energy efficient form of transport. Compared to using a car, public transport involves the inconvenience of the extra time involved in travelling to the nearest pickup point, waiting for the public transport to arrive, and then the extra travelling time on board due to many stops to pick up other passengers. A more regular service will help overcome the inconvenience of waiting and a greater range of routes will reduce the distance of travelling to a local pickup point.

If we use a car, then we should reduce the number of trips in any one day by doing a single round trip, rather than multiple trips. Cars are a means of transport. The days of a car being a status symbol are over. Large and heavy SUVs are wasteful of materials and energy and are extravagant purchases. A 1500 cc automatic car is more than adequate to transport four people over the hills of Dunedin.

Electric cars imported into New Zealand are still prohibitively expensive for most families – they cost much more than a decent second-hand petrol or diesel car and they have the extra burden of replacing an expensive battery. Electric cars currently sold in New Zealand weigh the same and use the same materials as petrol driven cars. The mindset of what constitutes an electric car needs to change. The ratio of the weight of an electric car to that of the passengers needs to be minimised as far as possible. A step in this direction is the two-seater Renault Twizy which is available overseas, but currently not in New Zealand.

Electric bikes have great potential, but are currently grossly overpriced in New Zealand at about $3,000. A conversion of a standard bike to an electric bike can be as low as $1,000. I would like to see the maximum power of electric bikes raised from 300 watts to 1,000 watts to handle the hills of Dunedin.

Electric scooters have potential at the price of $700, but sharing pavements is a problem. I have seen some scooters travelling faster than pedal bikes, so electric scooter could share cycle lanes.

Electric motorbikes on the road in New Zealand are now being sold at about $7,000. This price is still excessive, given that one can buy a decent petrol scooter for half the price.

It is the weather and safety factor, and also the hill factor in Dunedin, that put many people off from riding a bike whether pedal or electric. The weather and safety factor also put many people off from riding a motorbike whether petrol or electric. A solution against getting wet and cold on an electric bike or a motorbike is to use an alternative electric vehicle with a canopy such as the two-seater lightweight [PEBL](https://www.youtube.com/watch?v=Uos7H4ZFA48). A vehicle like the PEBL with 4 KW power to the wheels would handle the hills of Dunedin without the need to pedal.

The safety factor still remains a problem so long as bikes or low speed mopeds share the road with cars. One solution is to provide an absolute separation of cycle lanes from the roads used by cars. This approach has been adopted by a number of cities around the world. It is the combination of weight and the speed of the two modes of transport which are in conflict. Another solution is to reduce the speed of all modes of transport to, say, 25 or 30 kph around the city where physically separated cycle lanes are not provided.

Seth Wynes and Kimberly Nicholas have estimated the most effective ways to substantially reduce annual personal greenhouse gas emissions in their 2017 publication “*The climate mitigation gap: education and government recommendations miss the most effective individual actions”*. They are as follows:

1. Having one fewer child (an average for developed countries of 58.6 tonnes CO2-equivalent (tCO2e) emission reductions per year),
2. Living car-free (2.4 tCO2e saved per year),
3. Avoiding airplane travel (1.6 tCO2e saved per roundtrip transatlantic flight)
4. Eating a plant-based diet (0.8 tCO2e saved per year).

The list of additional actions that families and individuals can do to help reduce greenhouse gases goes on and on. The book *“*[*How Bad Are Bananas?: The Carbon Footprint of Everything*](https://www.amazon.com/How-Bad-Are-Bananas-Everything/dp/1553658310/ref=sr_1_1?s=books&ie=UTF8&qid=1522273015&sr=1-1&keywords=how+bad+are+bananas&dpID=412HieI%252BcrL&preST=_SY344_BO1,204,203,200_QL70_&dpSrc=srch)*”* by Mike Berners-Lee, 2011 and the website “[*The Green Ration Book: The Costs of Everyday Living*](http://www.greenrationbook.org.uk)*”* are excellent guides.

In summary, reducing greenhouse gases at a personal level means using less materials and energy by being more frugal. However, being more frugal would be self-defeating if subsequent surplus income is then used to purchase more consumption goods and services which generate greenhouse gas emissions. Surplus income enabled by adopting frugality should be invested in a transition from fossil fuels to renewable energy and infrastructure. This investment will also initially result in greenhouse gas emissions while renewables replace fossil fuels because renewables are unable to bootstrap the transition. This dynamic is a double whammy at the very same time we need to reduce greenhouse gas emissions. The key to absolute reductions is curbing unnecessary consumption.

**09 July, 2019**

**Modified copy of email to SCAN: New Zealand Member of Parliament Conscience Vote on the Zero Carbon Amendment Bill**

The Ministry of the Environment (MFE) document of advice to the Minister for Climate Change forms a background to the Zero Carbon Amendment Bill. In my opinion, all Members of Parliament should read this document before voting on the Zero Carbon Amendment Bill. The 186-page document (download [here](https://www.mfe.govt.nz/sites/default/files/media/Climate%20Change/regulatory-impact-statement-zero-carbon-bill.pdf)) includes a brief summary of New Zealand citizens' 2018 submissions to the MFE on pages 31 to 32.

I wonder how many Members of Parliament have actually bothered to read all pages of the above document so as to understand and take onboard the bases of MFE's advice. Although Member of Parliament voting on the Zero Carbon Amendment Bill should be a conscience vote to safeguard our future, I suspect that negotiations between all political parties prior to voting and final voting has been and will be based on party lines rather than fully informed decision-making. It is the political process that we are up against.

As I have stated in my previous posting on 19 June 2019, regardless of action at government level, a large degree of public focus on action should be on action at a local family and individual level. It is population growth and excessive consumption of energy and materials that has caused climate change, and we can all immediately participate in mitigating the impact of climate change by reducing our consumption levels. Any savings we make by doing so should be invested in renewable energy and infrastructure, otherwise expenditure of savings on additional goods and service other than renewable energy will contribute towards additional greenhouse gas emissions thus exacerbating climate change. Initial investment in renewable energy and infrastructure will also result in greenhouse gas emissions, but these emissions will in due course be offset by subsequent reductions in emissions by replacing the burning of fossil fuels with renewable energy.

**08 August, 2019**

**Immediate reduction in methane gas emissions from cows to avert runaway emission of methane from thawing tundra**

Yesterday I received a forwarded email from Greenpeace which states the following:

*“*Hi friends and family,

Right now, an area the size of Switzerland is on fire in the Arctic, July was Earth's hottest month ever recorded and Greenland just lost 12 billion tons of ice, in a single day. This is a climate crisis, and we have to act.

Around New Zealand and the world, people are sounding the emergency alarm and uniting to take action - but the NZ Government is failing to deal with our worst climate polluter - agriculture.

The Government has just put out a weak and dangerous proposal to “deal” with agriculture’s emissions.  It suggests minor and incremental changes that lets the dairy industry off the hook again, and leaves the rest of is subsidising their climate pollution.

What we desperately need to fight the climate crisis is **fewer cows** and a rapid transition away from intensive dairying towards plant-based regenerative farming.

The Government has asked for public feedback on their proposal, so it’s vital that you have a say now, in no uncertain terms.

Greenpeace has set up a quick and easy page that you can use to make a quick submission:

<http://greenpeace.nz/agriculture-ets-submissions>

I've done one, please take a couple of minutes now to join me, numbers are vital.”

I have added my personal comments to the above Greenpeace petition as follows:

“In 1972 John Maddox, then Editor of the international journal *Nature*, dismissed environmentalists’ concerns about climate change and global pollution as being overly alarmist in his book “*The Doomsday Syndrome”*. Maddox conceded that developing technology can lead to unintended consequences, but asserted that technology, human ingenuity, and social structures were able to rectify potential problems before they escalated. History has demonstrated that Maddox was wrong. Early warnings about climate change in the 1970s went unheeded and in hindsight we can now clearly see that 40 years ago the precautionary principle should have been adopted.  Governments should have protected the public from harm when scientific investigation had established a plausible risk.

We now face another plausible risk which has been verified by recent research by IPCC. There is currently a risk of major methane gas releases from thawing tundra which could lead to an irreversible change in the global climate despite the best efforts of all countries to reduce greenhouse gas emissions. The mechanism of a potential runaway is well established. The exact timing of such a runaway is currently in doubt.

New Zealand has already made a commitment to reduce greenhouse gas emissions. The question is what are the most effective and quickest methods of doing so. Carbon capture by planting trees takes time. Trees do not fully mature overnight. It will take time to replace fossil fuel-based infrastructure with that of renewable energy, and the transport sector will take time to transition from fossil fuels to renewable energy. The agricultural sector provides an opportunity to reduce greenhouse gas emissions overnight. An immediate 10% culling of our herds of cows would result in an immediate 5% reduction in our greenhouse gas emissions. Many countries subsidise their agricultural sectors and many countries have paid farmers not to grow crops so as to maintain price levels. New Zealand can do the same to enable farmers to transition to alternative food production. The 2019 World Resources Report “*Creating a Sustainable Food Future: A Menu of Solutions to Feed Nearly 10 Billion People by 2050*” … focuses on technical opportunities and policies for cost-effective scenarios to meet food, land-use, and greenhouse gas emissions goals in 2050.” A reduction in the herds of cows is one of a number of methods endorsed by the report. All other methods take time for transition.

My message to all Members of Parliament is that the risk of a runaway of methane gas emissions due to the thawing of tundra is plausible and the longer we delay in reducing greenhouse gas emissions, the greater is the risk. All Members of Parliament have a duty of care to protect the public from harm. One way to carry out this duty is to cast a conscience vote to implement an immediate reduction in greenhouse gas emissions by requiring the agricultural sector to fully participate immediately in the mitigation process.”

**10 August, 2019**

**IPCC 2019 Report: *Climate Change and Land***

A few days ago, the IPCC published the report “*Climate Change and Land”.* This report is a must read by all New Zealand Members of Parliament to enable them to cast informed votes on behalf of New Zealand citizens. The IPCC report reinforces the conclusions and recommendations of the World Resources Report (see my 8 August 2019 blog). I once again request all Members of parliament to cast conscience votes on issues of climate change mitigation instead of voting along party lines.

A summary of the report for policymakers and chapters of the full report can be downloaded from [here](https://www.ipcc.ch/srccl-report-download-page/)

The CarbonBrief website has an excellent review of the report - link [here](https://www.carbonbrief.org/in-depth-qa-the-ipccs-special-report-on-climate-change-and-land)

Jeremy Leggett has put together a slide show of the summary which can be downloaded from [here](https://drive.google.com/drive/folders/1pJlLMT57QZbUP0ZjWf5RMrexzDuanaC2) by selecting the file: 190808 IPCC report - Impacts.pptx

**12 August, 2019**

**“*A Brave and Startling Truth* & *A Pale Blue Dot”***

Yesterday in these days of troubling times, I was emailed the website address of a beautiful and relevant poem "*A Brave and Startling Truth*" by Maya Angelou - link [here](https://www.brainpickings.org/2018/05/09/a-brave-and-startling-truth-maya-angelou/)

Today I followed up on this theme and came across the compelling speech "*The Pale Blue Dot*" by Carl Sagan - link [here](https://www.youtube.com/watch?v=sb4WhNvLRFw)

**02 September, 2019**

**Global Erosion of Democracy**

I recommend viewing the following PowerPoint presentation on the global erosion of democracy by Jeremy Leggett:

"*How liberal democracy can die ... on our watch*" - link to view [here](https://jeremyleggett.net/2019/09/01/how-liberal-democracy-can-die-on-our-watch-a-pictures-and-charts-summary-for-the-busy/)

The original PPTX file, “*190831 How democracy can die.pptx”*, (45 MB) complete with citation of sources in the notes can be downloaded from [here](https://drive.google.com/drive/folders/1pJlLMT57QZbUP0ZjWf5RMrexzDuanaC2)

**16 September, 2019**

**Forthcoming Presentations by Steve Keen on 18th and 19th September 2019**

On 18th September, Steve Keen will give a presentation at the OECD “*Averting Systemic Collapse”* meeting in Session 5: “*New Approaches to Environmental Challenges”.* His presentation, "*Flawed (and New) Approaches to Environmental Challenges"*, is a devastating critique of William Nordhaus's flawed model and claim that climate change of 2° C will have minimal impact on global economic growth (global economic activity). William Nordhaus is a 2018 recipient of the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel (Nobel Memorial Prize) for research on economics and ecology. The OECD meeting will be streamed live – Link [here](http://www.oecd.org/naec/averting-systemic-collapse/)

On 19th September, Steve Keen will give a presentation at the *Rebuilding Macroeconomics Second Annual Conference* in the *Macroeconomics and Sustainability* session – Link [here](https://www.rebuildingmacroeconomics.ac.uk/2019-annual-conference). His presentation, "*Integrating Macroeconomics and Ecology via Energy and the Laws of Thermodynamics*" is a demonstration of how to incorporate energy into a modified Cobbs-Douglas model.

Patrons of Steve Keen on Patreon ($1 or $10 per month) can immediately download PowerPoints of the above presentations under his posting *“Presentations to OECD & NIESR on economics and climate change”* – Link [here](https://www.patreon.com/ProfSteveKeen/posts).

**21 September, 2019**

**Actions by Families and Individuals to Mitigate the Impact of Climate Change**

**INTRODUCTION**

Mitigation of the impact of climate change requires action not only at government, local body, and business level, but also at the family and individual level. The following list is ordered by the level of the impact of each action with the highest level of impact listed first by category and within categories. A background to the mitigation of climate change follows this list.

**ACTIONS YOU CAN TAKE**

**Family Size**

* Restrict your family size to a replacement level of two children.

**Food**

* Reduce or eliminate your consumption of meat of ruminants (cows & sheep) which belch out CH4 gas. Consider becoming a Vegan.
* Grow your own food using your own compost or buy local vegetables which are grown using permaculture principles.
* Do not buy imported food.

**Transport**

* International Transport
* Do not take international flights. Keep in contact with family and friends by Skype or similar.
* Transport between North and South Island
* Use public transport – train, bus, and ferry.
* Transport within South Island Transport
* Use public transport instead of a car – train and bus.
* Transport within Dunedin City
* Walk short distances instead of using a car.
* Ride a bicycle, electric bike, or electric scooter.
* Use public transport instead of using a car.

If you can afford an electric car and replacement of batteries, then buy a lightweight electric car and consider buying a two-seater electric car. Lightweight and two-seater electric cars are currently available overseas. Importation of these latest generation electric cars requires a New Zealand public demand for these cars. At the moment we are fobbed off with earlier generation electric cars.

**Housing**

* Make sure your house is fully insulated.
* In winter wear thermals and a jersey to help keep warm. Doing so will help reduce heating costs.
* Consider installing a heat pump. Set the lounge temperature to 20° C and if you use a heat pump to heat bedrooms, then set the temperature to 18° C. Do not use a heat pump for cooling in summer. Open windows and use a floor mounted fan instead.
* Consider installing a solar hot water system if you are building a new home
* Double insulate your electric hot water cylinder (HWC) and, for washing dishes, use a separate under the sink HWC or a system that heats only the flow of water and not a tank. Reduce the temperature of your main HWC to a comfortable level for showers.
* Avoid using a bath. Use a shower instead.
* Use cold water for washing clothes.
* Use LED lights instead of incandescent light bulbs.

**Consumption of Goods and Services**

* Do not spend your income on frivolous and unnecessary goods and services. The next time you make a purchase of goods or services, consider whether you just want it or whether you need it. Buy only what you need and not what you want.
* Do not buy upgrade items when your current item is still able to satisfy your needs.
* Buy only durable goods which can be repaired.

**Investment of Surplus Income**

* Do not spend your surplus income on additional goods and services. Invest your surplus income in renewable energy infrastructure.

**BACKGROUND TO MITIGATION OF CLIMATE CHANGE**

**Climate Change**

Current climate change is human induced and is a symptom of an excessive consumption of fossil fuels, the drilling, mining, and combustion of which emits carbon diode (CO2) and methane (CH4) gases to the atmosphere. CH4 is initially about 30 time more potent than CO2 as a heat trapping gas.  Plants take in CO2 from the atmosphere and release oxygen (O2). This is a cyclic process and the global levels of CO2 in the atmosphere fluctuate from season to season because the Northern hemisphere has a greater land mass with plants. Greenhouse gases in the atmosphere helps to keep our planet warm enough to enable life forms to survive. Higher levels of greenhouse gases and corresponding higher global temperatures might be beneficial for some forms of life on Earth, but not so for humans.

Nature on the land is now unable to absorb current additional levels of greenhouses gases due to our use of fossil fuels and continued deforestation exacerbates rising levels of CO2 in the atmosphere. The oceans are able to absorb CO2 and have done so to the extent that the oceans have become more acidic. This rising acidity is destroying coral reefs, the refuge of many species of fish, and weakens the shells of sea life. The oceans have also absorbed more heat from rising global air temperatures and the increase in the temperature of the oceans is the cause of extreme weather in the form of cyclones and storm surges. Melting ice at the poles is contributing to rising sea levels. Extreme temperatures are affecting the survival of many species, and even though CO2 is a source of food for plants, food production levels are threatened by extreme temperatures. If we do not stop using fossil fuels as quickly as possible, then we risk a runaway of climate change which we will not be able to stop. The survival of our species would be under threat.

**Energy and Economics**

All economic activity (both goods and services) requires the consumption of energy. In the words of Professor Steve Keen, labour without energy is a corpse and capital without energy is a statue. GDP (Gross Domestic product) is our current best measure of both good and bad economic activity. The need to replace commercial buildings, housing, and infrastructure after the Christchurch earthquake increased our GDP and increases in crime and ill-health also increases GDP when burglar alarms are employed to prevent crime and the heath system expands to accommodate ill-health. Any increase in goods and services, whether good or bad, requires an increase in the use of energy. There is nearly a 100% linear correlation between the global volume of fossil fuels supplied and consumed each year and the global annual GDP per capita measured in constant dollar terms. There is also a strong correlation between changes in the global consumption of fossil fuels and changes in the global GDP per capita. Changes in the global consumption of fossil fuels precede changes in global GDP per capita. The level of our economic activity (GDP) is determined by the availability and consumption of energy. But we don’t need to have an understanding of economics to know that use of energy is paramount for any economy. No initiation of movement or chemical changes can take place without energy being involved.

Many claims of increases in the GDP of a country avoid and cover up an inconvenient fact that GDP per capita may have hardly increased at all, has remained constant, or has declined. When there is a growing population, GDP must increase in order for the GDP per capita to remain the same. We are then back again to the cause of climate change by promoting further economic growth.

**The Need to Transition from Fossil Fuels to Renewable Energy Sources**

We need to transition from fossil fuels to renewable energy sources (solar panels, wind turbines, and geothermal etc.) in order to reduce our current levels of greenhouse gas emissions. Nuclear energy is an option, but has serious waste disposal problems. Fusion energy has yet to prove feasible, nonetheless viable. Hydrogen is not a source of energy. It is instead a carrier of energy because it takes more high-grade energy to convert water (H20) into hydrogen (and oxygen) and then compress that hydrogen than the resulting energy available in compressed hydrogen.

**Mitigation of Climate Change, Investment in Renewable Energy Infrastructure, and Consumption Levels are Interlinked**

A transition to renewable energy requires an investment in renewable energy infrastructure. This investment, in turn, will require the use of fossil fuels because renewable energy alone cannot bootstrap the transition. In order not to further increase the levels CO2 emissions during this transition, we need to divert investments away from additional fossil fuel exploration and avoid frivolous consumption.

Global consumption of fossil fuels is a product of growth in population and growth in per capita consumption of resources, including fossil fuels. There are no humane ways to reduce our current global population (nature is waiting to do this for us if we fail to adequately mitigate the impact of climate change), so we are left with the option of reducing our per capita consumption in order to mitigate the impact of climate change.

A person living in developed countries such as New Zealand consumes at least 20 time more resources than a person living in an underdeveloped country. A reduction in the consumption level by a person living in a developed country therefore has more impact on reducing CO2 emissions than a person living in an underdeveloped country. GDP is not a measure of wellbeing. Once a country achieves a minimal level of GDP per capita, further increases in GDP per capita do not result in greater human wellbeing. There are countries with half the GDP per capita of New Zealand which have similar levels of human wellbeing as New Zealanders. New Zealanders are well capable of living more frugally by avoiding conspicuous and frivolous consumption and by not trying to keep up with the Jones’s. By living more frugally, the resulting surplus of your income over and above your expenditure can be invested in a transition from fossil fuels to renewable energy. Spending your surplus income on additional goods and services can but only result in additional emissions of CO2 to the atmosphere. Investment in renewable energy infrastructure will, in due course, result in lower CO2 emissions.

Refer to the following sources for a detailed account of the energy and resources involved in the production and consumption of goods and services and the resulting emissions of greenhouse gases:

*“Ecological Footprint: Managing Our Biocapacity Budget”* by Mathis Wackernagal and Bert Beyers, 2019 - Amazon.com link [here](https://www.amazon.com/Ecological-Footprint-Managing-Biocapacity-Budget-ebook/dp/B07S6RTTSP/ref=sr_1_fkmr0_1?keywords=Ecological+Footprint%3A+Managing+Our+Biocapacity+Budget+by+Mathis+Wackernagal+and+Bert+Beyers&qid=1569055071&s=books&sr=1-1-fkmr0)

*“How Bad Are Bananas?: The Carbon Footprint of Everything”* by Mike Berners-Lee, 2011 - Amazon.com link [here](https://www.amazon.com/How-Bad-Are-Bananas-Everything/dp/1553658310/ref=sr_1_1?keywords=How+Bad+Are+Bananas%3F%3A+The+Carbon+Footprint+of+Everything+by+Mike+Berners-Lee&qid=1569055105&s=books&sr=1-1)

*“New Zealand Green House Gas Inventory 2019”* by NZ Ministry of The Environment (MFE), 2019 - Download link [here](https://www.mfe.govt.nz/sites/default/files/media/Climate%20Change/nz-greenhouse-gas-inventory-2019.pdf)

**22 September, 2019**

**Getting the Message Across About the Need for Family and Individual Climate Change Action**

The issue of population growth has been the elephant in the room for far too long. The message about limiting families in developed countries to two children needs to be conveyed to the public. Some developed countries have already attained Zero Population Growth (ZPG) within its natural population, but there are still families who plan on having more than two children. One less child in each family within a developed country has a greater impact on mitigating the impact of climate change than any other action. A sharp decline now in the birth rate within a country has an impact on the age composition of the population which, if extreme, can be problematic when children born now and in the future reach working age. However, the scale of any such future problem is nowhere near as dire as the need to immediately address the mitigation of climate change. How best to convey this fact to the public is the big question.

Mitigating the impact of climate change while, at the same time transitioning from fossil fuels to renewable energy, is impossible unless we all reduce our consumption of goods and services. The connection between energy, economics, and climate change mitigation is not commonly known. Some researchers and organisations advocate deliberate and planned degrowth in a transition from a growth to a steady state economy. My message (and it is the message of many others as well) is that reductions in the consumption of goods and services accompanied by investment of surplus income in renewable energy infrastructure will be necessary in order to avoid exacerbating the impact of climate change. This message is likely to be unpalatable to many people, but nonetheless there is a need for a rapid change in mindsets and action because lurking in the background is the ever-attendant risk of crossing climate change tipping points where positive feedback processes dominate negative feedback processes and runaway climate change becomes irreversible. The current thawing of tundra and release of methane (CH4) which is 30 time more potent than CO2 is one example of a potential tipping point. CH4 released to the atmosphere results in higher global temperatures which in turn accelerate the thawing of the tundra which in turn releases more CH4. This process will continue to accelerate unless the current rate of increase in global greenhouse gas emissions is curbed and the net volume of global greenhouse gas emissions is reduced to zero. Once again, the question is how best to convey the need for immediate action by everyone and not just by governments and corporations.

We have all played a part in contributing to climate change whether unwittingly or not. People in developed countries are likely to resist changing their life styles to the full extent that is required. This is where government comes in. Imposition of carbon taxes and rationing will force action by citizens within each country. But citizens in France have already violently resisted minor additional carbon taxes. Part of the problem is the inequality between people within developed countries and the distrust of those at the bottom of the totem pole to carry the costs of those at the top. It is the wealthy countries and the wealthiest within wealthy countries who have contributed the most to climate change by way of excessive consumption of goods and services. Mitigating the impact of climate change is highly political. There is a now a movement to make a change to international law whereby lack of appropriate action by governments and corporations to mitigate the impact of climate change is made a crime which can be prosecuted by international courts. But international law is repeatedly broken with impunity by a number of rogue nations. I am gradually coming to the pessimistic conclusion that true action will only take place when governments and citizens are forced by nature to discontinue business as usual. Action by then might be too late.

**29 September, 2019**

**Liebig’s Law of the Minimum and Future Technology**

In Allan Savory’s 2013 TEDTalk on YouTube, [*How to green the world's deserts and reverse climate change*](https://www.youtube.com/watch?v=vpTHi7O66pI)*, he* advocates using bunched and moving livestock to mimic nature as a means to heal the environment and he claims that only livestock can reverse desertification. A subsequent 2016 YouTube video [Part 1](https://www.youtube.com/watch?v=_EDpuQMpyYw) and [Part 2](https://www.youtube.com/watch?v=Z5BqDyDrj8E) debunks Allan Savory’s claims. Nonetheless, one of his claims is based on the wonderful and fascinating extent of [symbiosis](https://en.wikipedia.org/wiki/Symbiosis) between different life forms – plants, animals, fungi, protists, archaea, and bacteria (other life forms include the non-cellular life forms – viruses and viroids). Allan Savory’s claims of symbiosis between cattle and grasslands are not totally fanciful. What Allan Savory forgot was Liebig’s Law of the Minimum which states that growth only occurs at the rate permitted by the most limiting factor – lack of water in a desert limits growth in plants. Some people believe that an increase in CO2 in the atmosphere will be good for all plants as they will be able to grow more. That is true, but only to a limited extent. Plants also need water, trace elements, etc. for full growth.

Liebig’s Law applies not only to nature, but also to human civilisation. The limits of what technology is possible after a transition from fossil fuels to renewable energy are currently uncertain. The technological development of our species has so far been based on transitioning from low grade energy to higher grade energy (fossil fuels) while at the same time mining mineral resources at relatively low energy costs using higher grade energy. From now onwards the reverse will apply for both energy quality and mining of minerals.

Future transitional adjustments have been made more difficult with a current global population of 7.7 billion people with many people in the developed countries believing that business as usual can and should continue during a transition from fossil fuels to renewable energy. Liebig’s Law says otherwise. The type of renewable energy infrastructure that future civilisations will be able to sustain is in doubt. History provides a glimpse of what is possible - civilisation was once totally dependent on renewable energy. I suggest the technological level that future generations will be able to sustain lies somewhere between that of the 16th century and possibly as far forward as 1920. Whether future generations in 200 years’ time will be able to sustain computer technology remains uncertain.

Our immediate focus is on the here and now. There are strong signals that sufficient action will not take place to mitigate the impact of climate change. There is currently not only insufficient action at government levels throughout the world, but there is also lack of action by families and individuals in the developed countries. Some commentators suggest that developed countries will need to reduce their consumption of goods and services to 20% of current levels in order to effectively address climate change.

The extent of inequality in the technological development between countries might prove to be an advantage for some underdeveloped countries when it comes to adjustment during a transition from fossil fuels to renewable energy. The infrastructure of developed countries is based on and relies on high grade energy. That is not so much the case in lesser developed countries. High grade energy has enabled higher levels of urbanisation. Countries with a lower degree of urbanisation will be able to transition more easily to local food production.

Meanwhile, lurking in the background is the inevitable peaking of all forms of fossil fuels. It is ironic that if peaking of all fossil fuels had occurred in the 1970s instead of OPEC’s oil embargo, then the current extent of climate change would have been much less. As time moves on, a focus on resilience and preparedness seems to be more and more necessary.

**03 October, 2019**

**Recommended Reading on Denialism and The Rights of Future Generations**

*“Denialism: what drives people to reject the truth”* - The Guardian 2018 link [here](https://www.theguardian.com/news/2018/aug/03/denialism-what-drives-people-to-reject-the-truth)

*“Bad ancestors: does the climate crisis violate the rights of those yet to be born?”* - The Guardian 2019 link [here](https://www.theguardian.com/environment/2019/oct/01/bad-ancestors-climate-crisis-democracy)

**07 October, 2019**

**Countries of the Blind**

My *S*eptember 2017 *“Climate Change Project*” video on [YouTube](https://www.youtube.com/watch?v=_MvyDfi4BIA) and my e-learning version on this [website](http://www.insearchofsteadystate.org/e-learning/theclimaterealityproject/story_html5.html) using slides, animation, and script provided by the [*Climate Reality Projec*t organisation](https://www.climaterealityproject.org) is based on 2016 data. This video finishes on an optimistic note. However, after viewing this video again today in October 2019, I now regard the end message of this video as being prematurely optimistic. Yes, renewable energy had been growing exponentially leading up to 2016, but since 2016 this growth rate has slowed down and, in October 2019, we are still nowhere any closer to all nations pulling together to reduce CO2 emissions. Global greenhouse gases have continued to increase since 2016 with no signs of abatement. Australia is currently exporting coal to China which now emits 27% of global greenhouse gases. China and the US together account for 40% of global emissions and the commitment to action by major countries at the recent *UN Climate Change Summit* was a disappointment (see [VOX](https://www.vox.com/2019/9/24/20880416/un-climate-action-summit-2019-greta-thunberg-trump-china-india)). It is now more likely that sufficient and timely action by major governments will not be taken to mitigate the impact of climate change.

The only action anyone can guarantee is personal action and a group of like-minded citizens can make a difference at a local level. When it comes to inaction by governments, there is an element of collusion between governments and citizens. Governments will continue to avoid making hard decisions unless there are sufficient numbers of voters at polling booths who are willing and prepared to help mitigate the impact of climate change by making real changes to their lives by consuming less and paying more for fossil fuel energy by way of carbon taxes. Unfortunately, these voters are currently in the minority. Those who can see the need for sufficient and timely action to mitigate the impact of climate change are not Kings in countries where the majority of citizens are blind or refuse to see.

(See Wikipedia's [summary](https://en.wikipedia.org/wiki/The_Country_of_the_Blind) of “*The Country of the Blind”* short story by H.G. Wells)

**8 October, 2019**

**Opposing the mindset of climate change deniers using humorous cartoons**

We have every reason to be concerned with changing the mindsets of climate change deniers and trivialists, especially if they are local city councillors or members of parliament who can use their votes to oppose necessary and timely climate change action. Those who are in denial or who trivialise the impact of climate change frequently base their opposition to climate change action on an incoherent set of arguments. The website "[*Cranky Uncle*](http://crankyuncle.com)*"* uses humorous and satirical cartoons to identify, ridicule, and oppose the spread and influence of defective climate change denial reasoning. A cartoon can indeed convey a thousand words.  See also the “*Cranky Uncle*” [Facebook page](https://www.facebook.com/crankyuncles/).

I have listed the websites of a number of cartoonists and comic book writers who focus on issues of climate change and sustainability [here](http://www.insearchofsteadystate.org/miscellaneous-humour.html). Some websites give permission to organisations or individuals to make free non-profit use of their material without breach of copyright. I have contacted Polyp who has given me permission to use his cartoons on my website and web-based publication. I have yet to contact Cranky Uncle for the same permission.

The following publication *“The 'Alice in Wonderland' mechanics of the rejection of climate science”* by Stephan Lewandowsky, John Cook, and Elisabeth Lloyd, 2016, can be downloaded from [here](https://l.facebook.com/l.php?u=https%3A%2F%2Flink.springer.com%2Farticle%2F10.1007%2Fs11229-016-1198-6).

**26 October 2019**

**Is Peak Oil the Other Elephant in the Room?**

I have come across the attached report:

"*Peak Oil Background Study: Climate Change Peak Oil Strategy 2010-2020"* by the Sunshine Coast Regional Council, Australia,  2010 – Download link [here](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwiZ-PHukbjlAhVFcCsKHZgUCbEQFjAAegQIABAC&url=https%3A%2F%2Fd1j8a4bqwzee3.cloudfront.net%2F~%2Fmedia%2FCorporate%2FMigrated%2FFiles%2FUploads%2Faddfiles%2Fdocuments%2Fopof%2Fclimatechange%2Fpeakoilbgstd.pdf%3Fla%3Den&usg=AOvVaw0pvdGZfo3z-U1YzV1FHHyB)

Has any New Zealand Regional Council published a similar report or, for that matter, has any New Zealand Government Department published a similar report? Is Peak Oil (an undeniable reality with only the timing being uncertain) another elephant in the room like population growth. Time, energy, and resources have been devoted to addressing the symptoms of climate change instead of tackling the causes - population growth and excessive consumption per capita. There is also a need to respond appropriately to the inevitability of the peaking of fossil fuels. We should have invested a substantial part of our stocks of fossil fuels into flows of renewable energy decades ago instead of squandering them on excessive consumption. The signals and warnings to do so were there 40 years ago, but have gone unheeded at government level.

**29 October 2019**

**Revised copy of reply to SCAN:** [**Submissions to Interim Climate Change Committee call for Credible Data and Evidence**](https://www.iccc.mfe.govt.nz/what-we-do/call-for-evidence/)

Hi Donna,

I have been busy doing some background work before replying to your question as to whether I will be making a submission to the Interim Climate Change Committee (ICCC). Download Evidence and Response Form [here](https://www.iccc.mfe.govt.nz/assets/PDF_Library/68feeb9256/Call-for-Evidence-Response.docx)

1. I have had a look at the composition and background of the committee. The membership comprises those with a corporate background - Dr David Prentice (Chair, and CEO of Opus) and Dr Keith Turner (former CEO of Meridian Energy).  I am sure that Dr Jan Wright (former Parliamentary Commissioner for the Environment) and Dr Suzi Kerr (a specialist advisor to the committee) would be sympathetic to submissions from, say, Wise Response. I assume that Dr Harry Clark would also be sympathetic given his expertise on agricultural greenhouse gas research. I am unsure about where Ms Tumahai Kaiwhakahaere's sympathies lie.

I note that the committee does not include an economist. In my earlier submission to the [NZ Carbon Bill](https://www.mfe.govt.nz/have-your-say-zero-carbon)

[05302-Ivan JOHNSTONE](https://www.mfe.govt.nz/sites/default/files/media/Consultations/05302_Ivan_Johnstone_Redacted.pdf)

I recommended:

"Add Climate Change Commissioners who have the following expertise: An Ecological Economist with experience in dynamic stock-flow modelling of material and energy flows through an economy. A Monetary Economist with experience in the banking sector and use of dynamic stock-flow monetary modelling using Minsky which makes use of double entry book-keeping Godley Tables."

In the absence of an economist on the committee, it is likely that economic advice from the MFE will be based on neoclassical economics dogma. This dogma has been well and truly debunked by credible peer reviewed research. For recommended books that critique neoclassical economic, follow the link [here](http://www.insearchofsteadystate.org/books-economics-critiques.html).

2. The ICCC is based within the Ministry of the Environment (MFE) and draws upon the research and modelling of scenarios expertise of MFE staff. The answers to many of the questions in the submission should surely have already been provided by MFE staff. It is a big ask for any individual researcher outside of a research organisation such as the MFE to respond to all of the questions in the form as required and especially within the short time frame allowed (4 weeks).

3. On 16th July 2019 the ICCC released a report [*Accelerated Electrification*](https://www.iccc.mfe.govt.nz/what-we-do/energy/electricity-inquiry-final-report/) which was based on research carried out by MFE staff using MFE simulation models.

"The Interim Climate Change Committee recommends that Government should prioritise accelerated electrification of transport and process heat over the goal of achieving 100%renewable electricity by 2035."

“New Zealand has long benefitted from a high percentage of renewable electricity generated from hydropower and, increasingly, from wind. As a result, electricity generation is responsible for less than 5% of New Zealand’s greenhouse gas emissions, whereas fossil fuels used in transport and process heat account for about 30%,” says Committee Chair, Dr David Prentice.

"The report shows that under the current system, the percentage of renewable electricity is on track to rise from 82% to up to 97% by 2035 without further intervention."

What I am especially pleased to see is that closure of the New Zealand Aluminium smelter is considered under a number of scenarios. I have been advocating for some time that closure of the Aluminium Smelter should be considered as an option. I have misgivings that the modelling is based on GDP projections. It will take me some time to fully absorb the methodology and results of the report. I don't think that the impact of peak oil has been incorporated in the modelling or the risk of accelerated thawing of the tundra and runaway release of methane gas to the atmosphere.

4. The ICCC calls for credible data and evidence when replying to a number of difficult and complex questions and states that the ICC is not looking for personal views or opinions. However, when making use of credible data, it is subjective judgement that determines the outcome. Simulation models are not devoid of subjective judgements. A group of people can all agree that climate change is human induced, but will differ as to how to respond depending on each person's level of perceived risk and many other subjective factors.

5. Regardless of credible data and evidence, mitigation of greenhouse gases is a political process where data and evidence can be and frequently is dismissed and ignored by politicians. The political decision not to include the agricultural sector in the Emission Trading Scheme until 2025 is an example. This is a clear example of where politicians do not regard absolute reductions in greenhouse gases as being a priority. New Zealand politicians have made a trade-off between the personal benefits of being re-elected in a years’ time against the risks of greater impact of increased greenhouse gas emissions in the future.

6. Questions 1, 2, 3, and 4 (Section A The first three emissions budgets) are difficult for an individual to reply to. Question 5 states:

"What circumstances and/or reasons do you think would justify permitting the use of offshore mitigation for meeting each of the first three emissions budgets? And if so, how could the proposed Commission determine an appropriate limit on their use?"

The answer to question 5 can only be but a subjective reply. In my opinion, use of offshore mitigation for meeting each of the first three emission budgets should not be permitted. The reasons for my opinion are based on ethics. All New Zealanders are responsible for greenhouse gas emissions and we should all make absolute reductions in our emission here in New Zealand and not pass the buck onto another country to do so for us just because we are a relatively rich country and can afford to pay another country to do so while maintaining our current lifestyle.

7. Questions 6, 7, and 8 (Section B Emissions reduction policies and interventions) are also complex questions for an individual to respond to.

8. Questions 9 and 10 (Section C Impacts of emissions budgets) offers scope for individuals to respond to.

Question 9 states:

"What evidence do you think the proposed Commission should draw upon to assess the impacts of emissions budgets?"

Example replies to question 9 include:

Modelling of the impacts of emission budgets should be based on Indicators of [Wellbeing](https://en.wikipedia.org/wiki/Well-being) and not [GDP](https://en.wikipedia.org/wiki/Gross_domestic_product). Assumptions that increases in GDP provide greater Wellbeing is not supported by credible data and evidence.

Simulation modelling of the economics of greenhouse gases should include the banking sector. Creation of money to help mitigate the impact of climate change should be restricted to the Reserve Bank at zero interest. Government debt never needs to be paid back.

Question 10 states:

"What policies do you think the proposed Commission should consider to manage any impacts of meeting emissions budgets? Please provide evidence and/or data to support your assessment."

I need time to think about a reply to this question.

9. Question 11 (Other considerations, evidence or experience) states:

"Do you have any further evidence which you believe would support the future Commission’s work on emissions budgets and emissions reduction policies and interventions?"

Mitigation of Climate Change requires action not only at government and local body level, but also requires action by individuals and families. There is credible data and evidence that greenhouse gases are directly related to the level of population in any country and the per capita level of consumption of goods and services. In order to reduce greenhouse gases, all citizens in the developed countries need to reduce their consumption levels and recognise that continued economic growth will exacerbate emissions of greenhouse gases. The general public needs education as to why they need to take action at a personal level to reduce greenhouse gas emissions and the most effective ways they can reduce their impact. There are many credible publications on how best to do this. The ICCC should endorse and support resources for education of the general public.

Donna, in answer to your question as to whether I will be making a submission, yes, I will be, but I will not respond to all questions when the MFE has the resources and time to provide the answers for the ICCC.

**1 November 2019**

**Copy of email to SCAN: Submissions to Interim Climate Change Committee call for Credible Data and Evidence** **continued from 29 October 2019 Posting**

Question 10 states:

"What policies do you think the proposed Commission should consider to manage any impacts of meeting emissions budgets? Please provide evidence and/or data to support your assessment."

The following policies (plans of actions by an individual or social group) address Question 10:

1. If the new Emission Trading Scheme (ETS) should show clear signs of no reductions in greenhouse gas emissions over the next two years, then the ICCC should implement a carbon tax on fossil fuel energy which ramps up as quickly as possible to at least US $250 per tonne, a level which is in accordance with current United Nations recommendations. A carbon tax will result in a higher price for fossil fuels. The evidence of history tells us that consumption of fossil fuels declines when price increases. Rationing of fossil fuels is also an option. Wartime experience (and logic) tells us that rationing is the most effective way of reducing consumption. Carbon tax revenue should be invested in local public transport which uses renewable energy and electrification of the national railway network.

2. All permits for offshore drilling for oil and gas and onshore mining for coal should be immediately rescinded. There is credible data and evidence that globally we already have more than enough proven fossil fuels reserves to tip global warming to over 5 degrees C. In order to avoid an existential threat to humankind, the vast bulk of existing fossil fuel reserves needs to be kept in the ground. Investment in fossil fuel exploration should be diverted to a transition from fossil fuels to renewable energy.

3. Licenses to import fossil fuel based vehicles should be reduced to zero by 2025. Licenses to import should be subject to public bids and the generated revenue should be invested in public transport and electrification of the national railway network.

4. Lightweight two-seater electric vehicles should be subsidised using revenue from licenses to import fossil fuel based vehicles or carbon taxes. Heavy-weight electric vehicles are wasteful of resources and energy, especially when occupied by only one or two people.

5. Low-speed 30 kph limits should be applied along transport networks within city boundaries where physical separation of bikes and cars is not possible. Use of bikes and low-speed electric scooter etc. needs to be encouraged and facilitated.

6. Importation of food from overseas should be immediately subject to import duties which annually increase to 2025. New Zealand is well able to feed itself and there would be minimal impact on each citizen's wellbeing and health should all food imports be banned after 2025.

7. Use of artificial fertilisers should be banned in 2025 if the agricultural sector does not transition away from artificial fertilisers to natural fertilisers by 2025. Permaculture farmers have already transitioned to natural fertilisers with no loss in profits.

There is credible data and evidence which backs up all of the above policies. A question arises as to whether the ICCC has any real legislative teeth or whether political watering down or rejection of ICCC policies will prevail.

**02 November, 2019**

**My Submission to the New Zealand Resource Management Amendment Bill**

"The 2004 amendment to the RMA specifically prohibits planning authorities from considering the global warming effect of greenhouse gas emissions. The offending sections are 104E and 70A both of which state that “…a regional council must not have regard to the effects of (such a) discharge on climate change….”

The above 2004 amendment to the RMA must be rescinded in new changes to the RMA because since 2004 the New Zealand Government has made a Paris Agreement commitment to mitigate the impact of climate change by reducing New Zealand's greeenhouse gas emissions. All development and construction activity involve substantial emissions of greenhouse gases and these emissions are most effectively scrutinized at a regional level.

The New Zealand government should add a clause to the Resource Management Amendment Bill that requires planning authorities to have regard to the objectives of the Zero Carbon Act, its targets and carbon budgets in decisions on whether to grant resource consent applications."

NZ submissions close 7 November 2019 - Make your submission [here](https://www.parliament.nz/en/pb/sc/make-a-submission/document/52SCEN_SCF_BILL_91358/resource-management-amendment-bill)

**13 November, 2019**

**My submission to the Interim Climate Change Commission**

My submission can be downloaded [here](http://www.insearchofsteadystate.org/downloads/Call-for-Evidence-Response-ICCC-2019-Ivan-Johnstone-FINAL.docx)

**05 December, 2019**

**European Environment Agency (EEA) "State and Outlook 2020 (SOER 2020)" report and Economic Growth**

In the last few days, the European Environment Agency (EEA) published its "State and Outlook 2020 (SOER 2020)" report. The full report (80 MB, 499 pages) can be downloaded from [here](https://www.eea.europa.eu/publications/soer-2020)

The Guardian has summarised the report with the following headline and leading paragraph as follows (link [here](https://www.theguardian.com/environment/2019/dec/04/dont-pursue-economic-growth-at-expense-of-environment-report)):

"Don't pursue economic growth at expense of environment - report

Europe’s environmental watchdog gives warning as climate crisis continues

Pursuing economic growth at the expense of the environment is no longer an option as Europe faces “unprecedented” challenges from climate chaos, pollution, biodiversity loss and the overconsumption of natural resources, according to a report from Europe’s environmental watchdog."

The EEA website states (link [here](https://www.eea.europa.eu/soer-2020/at-a-glance)):

"To be clear, Europe will not achieve its sustainability vision of ‘living well, within the limits of our planet’ simply by promoting economic growth and seeking to manage harmful side-effects with environmental and social policy tools. Instead, sustainability needs to become the guiding principle for ambitious and coherent policies and actions across society."

I have downloaded the report, done a keyword search of "economic growth" and copied each sentence containing this keyword together with adjacent sentences and paragraphs which provide context (download [here](http://www.insearchofsteadystate.org/downloads/EEA-Report-2020-keyword-economic-growth.pdf)). By doing so, I can see that the EEA website's above statement and The Guardian's summary are over-statements of what is actually contained in the EEA report. Nonetheless, the EEA report might be the first international report that suggests pursuit of economic growth is not the way forward. That, in itself, is a major landmark.

The EEA report has been written by a number of different authors who have drawn upon research carried out by a number of different researchers who have studied the progress of the decoupling of energy and GDP and the impact of economic growth on the environment in the form of greenhouse gas emissions. In recent decades greater GDP has indeed been generated per unit of energy due to improvements in efficiency. The EEA report states in a number of places that further decoupling is necessary in order to decoupling of meet greenhouse gas emission targets and there is the expectation that continued decoupling will enable further reductions in greenhouse gas emissions while continuing economic growth. There are mentions of diminishing marginal returns. No mention is made of the physical and thermodynamic limits to absolute decoupling. Some statements in the EEA report suggest that continued pursuit of economic growth will thwart efforts to meet greenhouse gas target reductions by 2030. The EEA website is much bolder in coming adamantly to this conclusion than the lukewarm conclusions in the EEA report.

**12 December, 2019**

**The new European Green Deal espouses continued economic growth as a solution to climate change**

I despair. The new European Green Deal espouses continued economic growth as a solution to mitigating the impact of climate change. The European Green Deal is "... aimed at economic growth and increasing prosperity.", a "... new growth strategy, for a growth that gives back more than it takes away.”  See The Guardian article [here](https://www.theguardian.com/environment/2019/dec/11/european-green-deal-will-change-economy-to-solve-climate-crisis-says-eu).

It is population growth combined with economic growth in per capita energy and resources consumption that has contributed to climate change and which has polluted and continues to pollute our global ecosystems. The politicians don't see this and I suspect that many supporters of mitigating the impact of climate change also don't see this. We need a mantra that says "Population growth needs to be curbed as soon as possible and expectations of continued economic growth must cease"

Greta Thunberg has been named 2019 Time Person of the Year - see the Al Jazeera article [here](https://www.aljazeera.com/news/2019/12/greta-thunberg-named-2019-time-magazine-person-year-191211132135202.html). According to Anand Giridharadas, the Time Magazine editor at large, "one of the most "powerful things" about Thunberg is that she "doesn't believe in the 'win-win'". "She is telling us that real change is costly, real change requires giving things up, the loss of power and privilege, new systems, new ways of life."

We have a situation of the child calling out "The emperor has no clothes." We have yet to hear the onlooking crowd also calling out "The emperor has no clothes." The emperor of economic growth has no clothes. Continued economic growth can but only exacerbate the impact of climate change. Somehow, we need to persuade the emperor to abdicate or at least put some clothes on, but until the onlooking crowd also calls out that the emperor has no clothes, the emperor is likely to continue with his self-delusion.

**15 December 2019**

**More on the promoting the expectations of economic growth**

In my previous blog posting I used the expression "I despair" not in the sense of lack of hope, but in that of the frustrated and exasperated parent's response to an errant teenager who should know better, but continually ignores warnings to look both left and right when crossing the road. I despair, what can one do to change that teenager's behaviour?

I made a comment some time ago about Nicholas Stern's use of the word "economic growth" in one of his reports and I surmised that he used that expression strategically in deference to political sensibilities. The European Union not only uses the expression "economic growth", but also promotes economic growth. This is what I object to.  Necessary change is going to be difficult enough as it is without promoting false expectations. In my opinion, we can do without organisations of influence sugar coating the changes that are necessary to help mitigate the impact of climate change. The issue of population growth has been the elephant in the room for far too long. We need cold hard reality to address this issue.  False assumptions of neoclassical economics and expectations of continued economic growth also needs to be challenged.

I have read the article "There is no economics without politics: Every economic model is built on political assumptions" (link [here](https://evonomics.com/political-economy-blind-spots-and-a-challenge-to-academics/)) and I largely agree with what Anat Admati has written. We do need to challenge the false assumptions and influence of lobbyists and neoclassical economists. I don't agree that ALL economic models are built on political assumptions. The foundations of Steady State economics are based on physical reality and not on assumptions. A sustainable economic system cannot grow ad infinitum. Surely any sane person can grasp this very simple concept. However, have a look at the most recent presentation by Dennis Meadows that I recommended viewing (link [here](https://www.youtube.com/watch?v=aRXb4bJhSSw)) where he provides a crowd participation example where people might well understand an instruction (or concept), but tend to follow the actions of others rather than what they know and understand.

As an aside, GDP measures both good and bad economic activity and leaves out activity which is not included in the market place. The economic activity of cleaning up of oil spills and reconstruction after an earthquake are included in GDP, but not the activity of the homemaker or those who grow their own vegetables instead of buying vegetables. The GDP indicator has one advantage in that it is highly correlated with total energy consumption by a nation and, in the absence of data on total energy consumption, GDP can be and is used where necessary as a proxy for energy consumption. If bad economic activity is reduced, then GDP for any one year is also reduced, even though the nation is better off in terms of wellbeing.

GDP is an indicator of the flow of economic activity and not that of wealth, the capital stock of buildings, infrastructure, and plant and machinery of a society. National Net Worth is the total sum of a nation's assets minus its liabilities. This is adjusted annually for physical depreciation. Our ecosystems are also a stock of wealth, and some research has estimated a financial value for these stocks. A nation can draw down on its capital stock of human built stock and also that of nature. The stocks and flows are like a bathtub. Focusing on only the flows (GDP) does not reflect the true wellbeing of a country over and beyond the fact that GDP includes bad economic activities. The services provided by capital stock with a life of more than one year provide a flow of psychic income and feelings of wellbeing. The annual flows into capital stock either top up and maintain the capital stock, increase the size of the capital stock, or draw down on capital stock. This applies for both human built stock and that of nature. Strictly speaking, some stocks are funds in that the services they provide cannot be exhausted more rapidly unless destroyed. An example is a single bed hotel room which can provide the services of a one bed for 365 days over a year, but not 365 services of one bed over one night. A stock of petrol at a petrol station can be exhausted over one month under usual demand circumstances or exhausted in one day in a panic run on petrol if petrol tanker supplies are blocked.

**10 January 2020**

**Reliance on Technology**

A New Zealand economist has replied to the Wise Response Society stating:

"In a finite world, even a zero-growth approach (without technological solutions) will eventually use up all resources - this follows from simple arithmetic. Thus, under both a zero-growth approach or a positive growth approach, one requires technological solutions to the finite resources question."

Capital stock of any form consists of a fund which provides services enjoyed over the service life span of that capital stock. All capital stock requires the consumption of energy and materials to establish and maintain. This applies to stone tools, bronze weapons, ... housing, infrastructure, plant, machinery etc., etc.

The services provided by capital stock used to be more direct. With advancing technology, a web of supply chains has expanded to provide services to the end consumer to the extent that some intermediary specialists provide services which can be enjoyed more directly. For example, we can cut our own hair using scissors (capital stock) in our own home (capital stock) instead of going to a hairdresser who uses scissors (capital stock) in her salon (capital stock) or the hairdresser can come to our own home using a transport system (capital stock). Regardless of how services are provided, all forms of services require the consumption of energy and materials.

Technology requires the use of concentrated minerals. Georgescu-Roegen in his book "The Entropy Law and the Economic Process" (1971) pointed out that mineral resources required for technology will ultimately become dispersed because there are physical and thermodynamic limits to recycling. The energy costs to concentrate dispersed minerals will eventually become prohibitive resulting in technology becoming increasingly unable to maintain physical consumption standards of living. Dispersal of minerals is an advantage for ecosystems, but is a handicap and an ultimate limit for Homo Sapiens unless we are able to migrate to another planet. Doing that comes under the category of fanciful and fantastical wishful thinking. Vaclav Smil has recently published the book "Growth from microorganisms to megacities" (2019) in which he addresses what is possible with regards to technology and a transition from fossil fuels to renewable energy.

In the far distant future, Homo Sapiens will have the choices of accepting a declining level of technology and a corresponding declining physical consumption standard of living or reducing their population to maintain the same per capita standard of living.  Ultimately, the prospect for Homo Sapiens is a return to being hunter-gatherers. This life style does not necessarily need to be brutish and short so long as Homo Sapiens is able to retain essential reposits of knowledge.

In the here and now, once a certain level of physical consumption standard of living has been achieved, further increases do not necessarily result in greater happiness. Why do we need to constantly pursue higher standards of living? Surely, emphasis should be on achieving equality between nations and within nations.

**22 January**

**The Dynamics of Air Pollutants and Human Induced CO2 Emissions**

In my previous blogs I have referred to the importance of taking into account the dynamics of changes in any system. Here is one dynamic which is not so well known with regards to the mitigation of climate change.

The combustion of fossil fuels produces emissions of carbon dioxide (CO2), a long-lived gas, and also short-lived pollutants (sulphur dioxide SO2 etc.) which contribute to the formation of atmospheric aerosols. Short-lived atmospheric aerosols cool the planet and masks the full potential of global warming due to emissions of greenhouse gases.

Aerosol particulates are highly toxic when inhaled, leading to millions of premature deaths per year. Phasing out of fossil fuel combustion will provide health benefits, but will also reduce the extent to which the warming induced by greenhouse gases is masked by aerosols. There are trade-offs between the rate of change in reductions in aerosols (flue-gas desulphurisation of coal-fired power plants) and reductions in CO2 emissions. According to research cited in a recent peer reviewed publication by [Shindell and Smith (2019)](https://www.researchgate.net/publication/335900984_Climate_and_air-quality_benefits_of_a_realistic_phase-out_of_fossil_fuels), if aerosols alone are rapidly removed, then the rate of warming could accelerate from current levels of about 0.2 °C per decade to 0.4 to 0.8 °C per decade.

China and other countries are undergoing programmes of reductions in SO2, but global levels of CO2 are currently not decreasing. Shindell and Smith (2019) conclude that “The apparent success of ongoing efforts to reduce air pollution such as China therefore adds to the urgency to phase out the use of fossil fuels.” Reductions in CO2 levels need to keep up pace with reductions in SO2 and other pollutants so as to avoid a pulsing effect of a sharp increase in global warming. Confirmation of Shindell and Smith’s research is needed.

There are some who advocate deliberately seeding the atmosphere with SO2 so as to reverse global warming. Such an action could have dire consequences and should be contemplated only if all other climate mitigation options are exhausted. The precautionary principle dictates that the best action to mitigate the impact of climate change is to reduce our CO2 emissions.  So far, that is not happening. The above dynamics provide more reason to reduce CO2 emissions as quickly as possible. The other reason to reduce CO2 emissions as quickly as possible is to avoid the risk of triggering tipping points which would result in irreversible positive feedback cascades.

**5 February 2020**

**If we are to have hope, then we must act now. Once we have action, then hope is everywhere**

If you haven't seen the following YouTube video before, then the following is a must see:

"The disarming case to act right now on climate change" | Greta Thunberg TEDTalk

<https://youtu.be/H2QxFM9y0tY>

Greta says that with her Asperger's syndrome, she sees the issue of climate change as being black and white. We don't need to have Asperger's syndrome to realise that the issue of climate change is black and white. We simply need to curb and reduce our burning of fossil fuels. Greta says she wouldn't finish her talk with a pep talk about hope. If this approach had worked in the past, then greenhouse gas emissions would have gone down by now. Greta says if we are to have hope, then we must act now. Once we have action, then hope is everywhere.

The first step to reducing greenhouse gas emissions is to curb our emissions. Only then do reductions follow. Greenhouse gas emissions will continue to increase so long as global populations continue to grow and global per capita burning of fossil fuels also continue to grow. The current global birth rate is greater than the replacement rate and will not decline to a Zero Population Growth rate overnight. Even if it did, the global population would continue to grow due to population momentum. Global per capita burning of fossil fuels needs to decrease at the same rate as the increase in global population in order for the global rate of burning of fossil fuels to remain static. It is only then that the rate of global burning of fossil fuels is curbed.

The rich countries have a per capita rate of burning fossil fuels that far exceeds that of poor countries to the extent that even though the population of the rich countries is much less than that of the poor countries, the rich countries account for the greater proportion of global burning of fossil fuels. The most effective way to curb global burning of fossil fuels is for the rich countries to immediately curb their burning of fossil fuels.

A question arises. What impedes and prevents curbing the burning of fossil fuels in the rich countries. Alongside many others, I claim that it is the expectations of and desires for continued economic growth which promote and result in continued growth in per capita burning of fossil fuels. It is this expectation and desire which needs to confronted and overcome before burning of fossil fuels can be curbed. The next step is then to decrease burning of fossil fuels.

Surely any sane person would agree that continued economic growth cannot continue forever on a finite planet. So then why do advocates of continued economic growth still hold fast to their dogma?  Perhaps it is for the same reason that while we are all aware of our own mortality, we put this finality aside when we are young and live as if life could continue in the here and now forever. As we get older, the reality of our mortality becomes more difficult to ignore. I suggest the mindset of continued economic growth is similar. Economic growth is regarded as being desirable in the here and now and also desirable and possible into the foreseeable future. The question of whether economic growth should continue or is possible to continue is not considered nor addressed. It is simply ignored. The mindset of continued economic growth needs a reality check and reality checks are not messages of hope.

We currently face a potential existential threat to humankind and ecosystems due to excessive burning of fossil fuels and subsequent emissions of greenhouse gases. If we are to have hope, then immediate action is required. In New Zealand we have politicians influenced by lobbyists who together oppose immediate action to curb and reduce the burning of fossil fuels. For them, continued economic growth is paramount. Votes are needed in the ballot box at our forthcoming national election in September 2020 for candidates who realise that business as usual cannot and should not continue and that support of government action to immediately curb and reduce our burning of fossil fuels is paramount over continued economic growth. In the meantime, our own personal actions to reduce our reliance on fossil fuels and our persuasion of other citizens to do the same will go a long way towards first curbing and then reducing the burning of fossil fuels.

We all need energy to survive, and as we curb and reduce our burning of fossil fuels, we need to replace those fossil fuels with renewable energy. There are doubts as to the extent that renewable energy can replace fossil fuels. Our total primary energy per capita in the future using renewable energy could well be much less than current levels using fossil fuels. If so, our lifestyles would then be very different. This is where preparedness and resilience for a different future is needed.

**11 February 2020**

**An Open Letter to All Members of Parliament from Seniors Climate Action Network (SCAN) - Download** [**here**](https://www.insearchofsteadystate.org/downloads/SCAN-OpenLetter-FossilFuels&Infrastructure-FINALv10.pdf)

"**Tena Koutou Katoa Members of Parliament**

Please find attached a letter in support of Environmental Justice Otepoti regarding the continued mining of fossil fuels and the need to develop renewable energy infrastructure in Aotearoa.

A summary and conclusion of the Open Letter here:

**THE NEED TO RESCIND ALL PERMITS FOR NEW DRILLING AND MINING FOR ADDITIONAL FOSSIL FUELS AND THE NEED TO DEVELOP ADDITIONAL RENEWABLE ENERGY AND ALLIED INFRASTRUCTURE**

**Summary**

· If greenhouse gas emissions are not sufficiently curbed as soon as possible, then there are real risks of triggering tipping points, the cascading of which will result in an existential threat to humankind and ecosystems.

· Reductions in CO2 levels need to keep pace with reductions in SO2 and other pollutants so as to avoid a pulsing effect of a sharp increase in global warming. A go-slow approach to reducing greenhouse gas emissions is a risky approach when China and India have every incentive to reduce their emissions of aerosol pollutants into the atmosphere.

· A transition from fossil fuels to renewables should take place not only as soon as possible, but also at the highest rate that is possible while still reducing greenhouse gas emissions. Unwarranted delays in transition would make a transition more difficult, if not impossible.

· A major proportion of proven fossil fuels reserves need to stay in the ground in order to avoid climate change exceeding the globally agreed Paris Agreement aim of holding warming well below 2°C.

**Conclusions**

The New Zealand Government should immediately rescind all permits for new drilling and mining for additional fossil fuels and divert a substantial proportion of available investment ($12 billion) to developing additional renewable energy and allied infrastructure now rather than later.

Signed on behalf of Seniors’ Climate Action Network (SCAN - greater than 50 members).

Ivan M. Johnstone – BSc (Physics), BArch (Hons), PhD - SCAN Research Member

Donna M Peacock - Secretary on behalf of SCAN members

Facebook: <https://www.facebook.com/groups/964056880274284/>

**15 March 2020**

**Parallels and Differences between Coronavirus and Climate Change Response Action**

Over the last few months, I have been following the response time and actions adopted by governments to address the coronavirus which has recently been declared as a pandemic by the World Health Organisation. There are striking parallels and differences in the response times and actions taken by governments to address the threat of the coronavirus. The same applies to the threat of climate change. I recommend viewing the New York Times article ["Coronavirus in N.Y.: Will a Surge in Patients Overwhelm Hospitals?"](https://www.nytimes.com/2020/03/14/nyregion/coronavirus-nyc-hospitals.html) and the New York Times [interactive model article](https://www.nytimes.com/interactive/2020/03/13/opinion/coronavirus-trump-response.html) on response times and actions to address the threat of the coronavirus:

The dynamic interactive model shows that prompt and drastic action will best meliorate the impact of the coronavirus. Dynamic models of how best to mitigate the impact of climate change also show that prompt and drastic action will best meliorate the impact of climate change.

The global impact of the coronavirus will unfold over the next number of months, whereas the global impact of climate change, exacerbated by peak energy, will unfold over a number of decades. The policies adopted by different countries to address the threat of the coronavirus already provide lessons which should be equally applied to addressing the threat of climate change.

In the worst-case scenario where inadequate action is undertaken and a large percentage of the population in any one country is infected by the coronavirus, the majority of that population will nonetheless survive and the country's infrastructure will still be intact. Life will return to normal in due course and the impact of the coronavirus will not be permanent unless the coronavirus or similar viruses mutate into a more virulent form. However, when it comes to climate change, the impact of inadequate action on current and future generations will be permanent. A transition from fossil fuels to renewable energy is made more difficult, if not impossible, should government investment in renewable energy and infrastructure be delayed.

**29 March, 2020**

**Recommended Videos on Coronavirus**

'WHO's Dr Mike Ryan: Coronavirus vaccine 'at least a year' away' - YouTube link [here](https://www.youtube.com/watch?v=4NFXE8Q-rQM)

'A Letter from the Coronavirus' - YouTube link [here](https://www.youtube.com/watch?v=6lvYwBvtCxA)

Note the striking parallel in Dr Mike Ryan's closing message (22 minutes in) and the message from the coronavirus.

**07 April, 2020**

**Hubris and Humility**The following is one of my favourite poems which aptly applies to modern society which is currently stricken by Covid-19:  
 **Ozymandias**I met a traveller from an antique land,

Who said— “Two vast and trunkless legs of stone  
  
Stand in the desert. . .? Near them, on the sand,  
  
Half sunk a shattered visage lies, whose frown,  
  
And wrinkled lip, and sneer of cold command,  
  
Tell that its sculptor well those passions read  
  
Which yet survive, stamped on these lifeless things,  
  
The hand that mocked them, and the heart that fed;  
  
And on the pedestal, these words appear:  
  
My name is Ozymandias, King of Kings;  
  
Look on my Works, ye Mighty, and despair!  
  
Nothing beside remains. Round the decay  
  
Of that colossal Wreck, boundless and bare  
  
The lone and level sands stretch far away.”  
Percy Bysshe Shelley

**16 April 2020**

**Creating Money, Universal Basic Income, and Debt Jubilee**

The prevailing claim that governments should run a balanced budget or surplus is based on outdated neoclassical economics ideology which has been negated decades ago by Modern Monetary Theory (MMT). Running the accounts of a nation is not the same as that of a household or business. This assumption is one of many myths perpetuated by neoclassical economists which have been thoroughly debunked by Steve Keen in his book [Debunking Economics](https://www.amazon.com/Debunking-Economics-Naked-Emperor-Dethroned-ebook/dp/B00A76WZZK/ref=sr_1_1?crid=2GLWABV84S921&dchild=1&keywords=debunking+economics&qid=1586897026&s=books&sprefix=debunking+economics%2Cstripbooks-intl-ship%2C375&sr=1-1)".

Commercial privately owned banks create money and then benefit from this right and privilege to do so by charging interest on loans over and above administrative costs and reasonable profit. Download two publications on banking [here](https://www.insearchofsteadystate.org/downloads/Banks-are-not-intermediaries-of-loanable-funds-Jakab&Kumhof-2015.pdf) and [here](https://www.insearchofsteadystate.org/downloads/Modern-money-theory-&-new-currency-theory-Huber-2015.pdf). which confirm that commercial banks create money. The primary source of profits of modern banks is not generated by serving as an intermediary between savers and borrowers. Governments can and have in the past created money using a central government controlled and owned bank. No interest needs to be charged on government debt and nor is it charged. Debt to oneself never needs to be repaid. A government budget deficit is not inflationary when a cash injection into the economy is necessary during a severe economic downturn.

Quantitative easing after the 2008 financial crisis bailed out privately owned banks and insurance companies in the United States, but did little to ease the subsequent burden of hardship on the majority of the community. The rich became richer and the poor became poorer. The Covid-19 pandemic highlights even more so the grotesque gap between the rich and the poor and the lack of social investment in healthcare in the United States. Privatisation of health care in the United States has failed - the costs of private health care and medical insurance in the United States is many times that of the NHS in the United Kingdom to the extent that a large sector of the population is excluded from healthcare.

Neoclassical economics currently has a stranglehold on government decision-making which, if followed and adhered to during the spread and containment of Covid-19 and subsequent recovery, would lead to greater debt incurred by many in the community. A minority would be financially better off as they would be beneficiaries of interest charged on loans which expand in size during any mortgage or loan repayment "holiday". Michael Hudson in his book “[J is for Junk Economics](https://www.amazon.com/JUNK-ECONOMICS-Guide-Reality-Deception-ebook/dp/B071W31MTM/ref=sr_1_1?crid=1Y837G7AH18SE&dchild=1&keywords=j+is+for+junk+economics&qid=1586898209&s=digital-text&sprefix=J+is+for+junk%2Cstripbooks-intl-ship%2C366&sr=1-1)” has pointed out that debt which cannot be repaid will simply not be repaid. Maintaining a balanced budget during and after a prolonged pandemic could lead to a collapse of our economic system.

Some worst-case scenarios project unemployment rising to as high as 25% during recovery of the Covid-19 crisis.  If this should be so, then it would be timely and appropriate for governments to implement a Universal Basic Income (UBI) sufficient for households to pay for the essentials of food and heating etc. while keeping a roof over their head without becoming more in debt.

Another issue is the plight of the poorer nations. A number of enlightened economists are advocating a debt jubilee for poor nations. Such an action is not without precedence. Debt jubilees were practiced by societies reaching back thousands of years. Poor nations have already repaid original debt many times over due to payment of interest and are now well overdue for a genuine helping hand instead of being offered more interest-bearing loans with austerity strings attached

I recommend viewing the 70-minute video “Macroeconomics and COVID-19 - Steve Keen” - Link [here](file:///E:\Research\In%20Search%20of%20Steady%20State%20Revisited\Word%20Files%20Drafts\My%20Personal%20Blogs\-%20https:\youtu.be\ejvPvoa_Qns)

For books critiquing neoclassical economics – Link [here](https://www.insearchofsteadystate.org/books-economics-critiques.html)

For videos critiquing neoclassical economics – Link [here](https://www.insearchofsteadystate.org/videos-economic-critiques.html)

**21 April 2020**

**Recommended Video on Regenerative Development – Presenter Bill Reed**

I recommend viewing the video “From Sustainability through Regeneration: Whole and Living System Design” - presenter Bill Reed - YouTube link [here](https://youtu.be/BFzEI1rZG_U)

Bill Reed refers to 100 million LEED platinum buildings at 1 min 57 secs into the video. LEED (Leadership in Energy and Environmental Design) is a Green Building rating system – see Wikipedia [here](https://en.wikipedia.org/wiki/Leadership_in_Energy_and_Environmental_Design).

In New Zealand we have the New Zealand Green Building Council (NZGBC) rating system called [Greenstar](https://www.nzgbc.org.nz/GreenStar).

I have also found the terms "sustainability" and "sustainable" to be loosely used by architects and designers. In the extreme, the terms are bastardised by economists who advocate sustainable growth, a description which is an oxymoron.

In 2007 I was under contract as an Environment Sustainability Design (ESD) Consultant to a major architectural firm in Auckland to update its internal Green Building manual. The manual had been authored by a recent PhD graduate in the firm who subsequently needed to focus on gaining practical experience for registration. I was invited to attend a design meeting for a multi-storey office building. At the end of the meeting, I was asked for my comments on the design. The design incorporated 100% mirror glazing from floor to ceiling on all sides of the building. Well, what could I say? The design negated the basic principles of low energy design that I had been taught as an architectural student some 40 years earlier. Put simply, 100% glazing whether double/triple glazed or heat reflecting leads to excessive heat loss in winter and excessive heat gains in summer. My reply queried how could the design team contemplate calling the building design a Green Building when the design broke the fundamental principles of low energy design. The lead architect replied that the team wanted to design sexy buildings.

Back then and even today far too many architects adopt the attitude that so long as a building satisfies a Green Building rating system, there is no need to minimise energy use required to heat a building in winter and cool the building in summer. Windows in a building provide a necessary view of outside and natural lighting reduces the need and costs to provide artificial lighting during the day. Different requirements need to balanced against each other. A true low energy design approach takes all requirements into account and seeks to optimise the overall design irrespective of whether a building design already satisfies a Green Building rating system.

**25 April 2020**

**Planet of the Humans Documentary**

I have now viewed the documentary "The Planet of Humans". The documentary asks the right questions, provides information which concurs with peer reviewed research in international journals, and reveals some very disturbing information on the politics behind the green movement. I was previously aware of the shortcomings of the Sierra Club, so revelations about the Sierra Club in the documentary came as no surprise to me. Revelations about Al Gore did come as a surprise. I am left feeling duped.

At 37 minutes to 39 minutes into the documentary there is a sped-up sequence of the mining of resources required to provide materials for solar collectors and wind turbines. The effect was melodramatic, but it served a purpose without belabouring the critical message. Green technology relies on the continued burning of fossil fuels. The messages about solar collectors and wind turbines apply to all countries. New Zealand does not manufacture solar collectors and relies on global supply chains of manufactured components, the materials of which are mined in other countries.

The documentary questions whether touted green technology is indeed truly sustainable. Many supporters of the green movement are currently unaware that green technology alone cannot support the current world population at the same current level of consumption that we enjoy now.

During the credits, a number of the leading proponents of biomass retracted their support of biomass after the first and second public screening of the documentary. In other words, they concurred with current research with regards to the use of biomass as a renewable energy source.

I recommend all members of the public to view the documentary.

When it comes to renewable energy in New Zealand, we already have a relatively high level of hydro and geothermal electricity generation with the potential to expand geothermal. If the smelter at Tiwai Point were to be closed down, then the electrical generation capacity for New Zealanders would increase by about 15%. What sort of society is possible in New Zealand if we relied on only hydro and geothermal generated electricity for all purposes? The level of total energy per capita for all purposes might be similar to that in the 1930s. Food production in the future would need to make use of natural fertilisers instead of artificial fertilisers based on fossil fuels. Regenerative farming would need to be implemented. It would be an advantage if the national railway network was fully electrified. What is our capacity for manufacturing at a primary level and will this manufacturing need to be at a regional level? In Dunedin we were once able to manufacture steam engines for the railways at the Hillside workshops. Melting ore back then required the use of fossil fuels. Can we do the same using electricity? How independent are we of global supply chains for our current necessities of life? Will we need to re-examine what we currently regard as necessities in the future?

I am optimistic about the long-term future for New Zealand so long as we are not overcome by a succession of pandemics, nuclear war, or invasion by nations which want to take control of our food production potential

**25 April 2020**

**Planet of the Humans Documentary**

I agree with all the bullet points that a member of SCAN has listed with the exception of population which is still the elephant in the room. I am a purist when it comes to population because it is the product (P X C) of Population and Consumerism combined with lack of regard for our ecosystems that has contributed to climate change and our ecological crises. Climate change in turn also impacts on our ecological systems. Globalisation etc. have helped to accelerate consumerism.

I have pointed out in my "In Search of Steady State Revisited" electronic publication on my website that apart from assisting the poor nations to raise their standards of living and education, there is no humane way we can accelerate reductions in the rate of population increases over the next number of critical decades due to in-built population momentum. In order to reduce the P X C impact on the environment, we need to focus on reducing consumerism. Life and business as usual should not and cannot continue in the future.

I agree it is easier to point out problems than to provide solutions. The documentary is short on any solutions, so does not provide a positive message.

I very much like the apt quote by William Gibson - "The future is already here — it's just not very evenly distributed". I have every reason to believe that the uneven distribution will continue into the future given especially the current lack of sufficient and much needed support for the poor nations during our Covid-19 pandemic. A debt Jubilee by the World Bank and the IMF is sorely needed as well as assistance by the rich countries to combat Covid-19.

At each level of technology, a certain minimum level of energy is required in order for critical links in our supply chains to exist and enable that level of technology. The system of computers, data storage, and the Internet are good examples. What is currently uncertain is the minimum EROI required to sustain that particular system and what renewable energy sources are able to provide.

The technologies of the past and the levels of energy prevailing back then provide some measure of what is possible in the future. In the longer term of many generations in the future, the peaking of minerals will limit the level of technology that our descendants will be able to use.

In the meantime, a transition from fossil fuels to renewable energy will involve the burning of fossil fuels because solar collectors and wind turbines alone cannot bootstrap the transition. This is a double whammy because we need to reduce CO2 emissions at the very same time as we need to transition to renewables. In order to transition to renewables while at the same time reduce our CO2 emissions, we will need to drastically cut back on unnecessary and extravagant consumption. It is a small percentage of the global population which burns the most fossil fuels. This privileged minority is unlikely to volunteer reductions in consumption. Rationing of energy on a per capita basis might be the only viable solution. This is where national and global politics and cooperation comes in. Responses to the Covid-19 pandemic provide a national and a global indication of the levels of action, urgency, and cooperation we can expect over the next number of decades while we try to reduce our CO2 emissions and transition to renewable energy.

**26 April 2020**

**Planet of the Humans Documentary**

I have been doing some more thinking about the " Planet of Humans" documentary. I am pleased that I saw the documentary and I was appalled at the hypocrisy of those who claim to be supporters of the green movement while, at the same time, are self-serving in the background.

What was the overall message of documentary? The documentary pointed out that the production of solar collectors and wind turbines require the burning of fossil fuels and the mining of resources which also involves the burning of fossil fuels. This is information the general public needs to know. There are difficulties with generation intermittency and backup systems are required. The general public also needs to know this. I expected more focus on battery storage and, at one stage, I thought the documentary was going to advocate the use of nuclear energy. Overall, the message of the documentary is that a transition from fossil fuels to renewable energy is problematic.

I agree that the documentary provides no solutions. The documentary is nihilistic and incomplete. Given this, do I still recommend the documentary for public screening. I am totally opposed to censorship and yet there are many members of the public who might conclude that a transition from fossil fuels to renewable energy is impossible and a futile waste of resources after watching the documentary. This is not so. However, I do believe that some members of the green movement need to be fully aware of the difficulties that we face. Solutions will require sacrifice, and yet many supporters of the green movement believe and behave as if life and business as usual can continue.

My approach for solutions is to consider the attributes of steady state settlements in the future compared to the attributes of growth settlements now and to reverse engineer, so to speak, possible transition pathways. We can ill afford to pursue blind alleyways. Transition pathways need to be not only feasible, but also viable. There is no room for Pollyanna wishful thinking approaches to transition from fossil fuels to renewable energy. Such approaches could lead to disaster

**27 April 2020**

**The difference between feasible and viable**

In earlier emails to SCAN and in my personal blog on my website I have addressed the importance of distinguishing between a process that is feasible and one that is viable. I have gleaned the following definitions from a number of dictionaries:

Feasible processes are processes that are possible provided you have sufficient time, money, or energy to carry out the process. A viable process is capable of working successfully at a large scale over a long period into the future.

Many people use the term “feasible” loosely when they actually mean “viable”. A process which is described as being feasible in the long term on a large scale should strictly be called viable.

Too many people latch onto magazine coverage of new processes which are feasible and assume they are also viable. Feasible processes might prove to be viable, but to pin one’s hopes on what is so far only demonstrated to be feasible can run the risk of pursuing dead end pathways in a transition from fossil fuels to renewable energy.

All renewable energy processes need to be examined with a critical and sceptical eye until the process has been demonstrably proven to be viable over a long period and at a large scale. A viable renewable energy source is truly sustainable in that it is able to repeatedly maintain and replace itself without the use of fossil fuels as a backup. Replacing the use of fossil fuels with renewable energy sources and infrastructure will initially require the use of fossil fuels, but once in place those renewable energy sources and infrastructure need to be truly sustainable without any further use of fossil fuels.

One way to examine and determine the viability of a system is to undertake a life cycle energy analysis of that process. Even then, the process might not be viable in the longer term, say beyond 200 years, when it is reliant on the mining of scarce minerals which will require greater levels of energy over time. The peaking of oil also applies to the peaking of mineral extraction.

The viability of biofuels was examined in the following attached publication in 2006:

“Can biofuels replace fossil energy fuels? a multi-scale integrated analysis based on the concept of societal and ecosystem metabolism: Part 1” by Mario Giampietro, Kozo Mayumi, and Jesus Ramos-Martin, 2006 which states:

“Many claim that biofuels represent a viable and desirable alternative to fossil energy fuels. This paper (the first of a series of two) provides a critical appraisal of the claim that a large scale move to biofuels is either feasible or desirable for powering the economy of a developed country.

… In relation to the future use of biomass for energy purposes it is crucial to eliminate the dangerous stereotypes currently proposed by the mass media and by those proposing the idea of farming for fuels. Biofuel is not a silver bullet solution to the actual energy crisis. The dream that everything in developed societies can remain the same by just replacing oil with ethanol from crops or plantations is very easy to sell in TV commercials but it is not feasible. It is only generating a dangerous myth in the perception of the general public.”

Note in the references section that the viability of biofuels was queried a number of years before 2006.

The above publication and subsequent publications resulted in the following book published in 2009:

“The Biofuel Delusion: The Fallacy of Large-Scale Agro-biofuel Production” by Mario Giampietro and Kozo Mayumi published 2009 – Amazon.com link [here](https://www.amazon.com/Biofuel-Delusion-Fallacy-Agro-Biofuels-Production-ebook/dp/B0081Z0EZW/ref=sr_1_1?dchild=1&keywords=%E2%80%9CThe+Biofuel+Delusion%3A+The+Fallacy+of+Large-Scale+Agro-biofuel+Production&qid=1587927820&s=books&sr=1-1)

In Bill McKibben’s response to the Planet of Humans documentary, he concedes that he initially supported biofuels and, in his defence, he writes:

“Like the film-maker, I previously personally supported burning bio-mass as an alternative to fossil fuels—in my case, when the rural college where I teach replaced its oil furnaces with a wood-chip burner more than a decade ago, I saluted it. But as more scientists studied the consequences of large-scale biomass burning, the math began to show that it would put large amounts of carbon into the atmosphere at precisely the wrong moment: if we break the back of the climate system now, it won’t matter if forests suck it up fifty years hence. And as soon as that became clear I began writing and campaigning on those issues. Here’s a piece of mine from 2016 that couldn’t be much clearer, and another from 2019 in the New Yorker about the fights in the Southeast, and another from 2020 as campaigners fought to affect policy in the Northeast”

Bill McKibben was at minimum 10 years behind the ball park in his tracking of peer reviewed publications on the viability of biofuels and 7 years behind a publicly available book which addressed the same issue. To a certain extent, Bill McKibben deserves some flak for helping to promote biofuels before 2016 when it was known since 2006 by the better-informed research community and since 2009 by some members of the public that biofuels are not viable.

We can all make mistakes. Bill McKibben's above mistake which contributed to a substantial waste of resources prior to 2016 is an example of why it is so important to base forward planning of a transition from fossil fuels to renewable energy on demonstrably proven viable processes. We do need to innovate and discover new processes, but at the same time we must keep in mind that a feasible process is not necessarily a viable process. Just because a process is possible does not necessarily mean we should adopt that process on a large scale.

**27 April 2020**

**Planet of the Humans Documentary**

I very much agree about the Planet of the Humans documentary becoming a wake-up call for the need to be more careful about where investments should go and I agree that SCAN has a role to play in "facilitating an improved understanding of the realities of the situation that the world is in.”

I hope that those who sign petitions to government to undertake appropriate action to mitigate the impact of climate change also understand that there is a social contract between citizens and government. Citizens also have a role to play, and I suspect that far too many citizens do not fully realise that successful participation in mitigating the impact of climate change will involve reductions in current levels of consumption. This is not a popular message.

Reductions in consumption directly related to reductions in the consumption of fossil fuels do not necessarily result in reductions in quality of life. A number of countries use far less fossil fuel energy per capita than that in New Zealand and yet enjoy the same level of quality of life that we enjoy.

The Planet of Humans documentary has certainly given us food for thought. A positive outcome of the documentary is for it to serve as a wake-up call in the same way as our current Covid-19 pandemic. Globalisation has now become a dirty word for many and there is now more of a recognition that localisation provides greater resilience.

People are now more aware of the need to shorten their supply chains and that primary industry in our home country needs to be better supported. Industries such as Fisher & Paykel which shifted off-shore should be heavily penalised with heavy import duties and local industries, especially in the provinces and smaller cities and towns should be better supported.

**27 April 2020**

**Planting and Cutting Down Trees**

From first principles, our immediate and foremost objective should be to reduce emissions of CO2 and its equivalents to the atmosphere as soon as possible so as to avoid potential tipping points.

Planting more trees will absorb CO2. There are peer reviewed publications on the rate that particular species absorb CO2, and each specie has a CO2 absorption profile while growing from a sapling to a fully grown tree. It is an advantage to plant fast growing trees so that CO2 is absorbed as soon as possible. I will leave it to the experts to advise on which species should be planted.

I note that planting trees is a somewhat futile exercise if we do not at the same time reduce our consumption of fossil fuels. Paying someone else to plant trees each time we take a flight might salve our conscience, but it does not cut the mustard when it comes to an accumulation of CO2 in the atmosphere. It will take time for that planted tree to absorb the CO2 emissions that you contributed to and we need to reduce CO2 emissions now and not later.

Cutting down trees and burning them will result in CO2 emissions at a time when we can ill afford to increase CO2 emissions. It will take time for replacement trees to absorb the CO2 emitted from previously burned trees. Sustainable harvesting with a balancing of emissions countered by absorption from the same forest takes time to establish. Sustainable harvesting with a zero CO2 impact occurs only when the CO2 emissions of a small cohort of a population of trees (a forest) which are cut down and burned are matched by the CO2 absorption of new trees that are planted and by trees that are growing and maturing. The dynamics of emissions and absorption are more complicated to model than that of, say, human populations. A steady state and stable human population is simply achieved when deaths at all ages equals births over a prolonged period.

Any form of CO2 equivalents emitted to the atmosphere adds to and accumulates in the atmosphere. Methane emissions are initially more potent. In my opinion, greater focus than that which is current should be placed on reducing methane emissions. It is now that we need to reduce all forms of CO2 equivalents. It is no solace that the impact of methane disappears in the future while current methane emissions contribute to potentially triggering tipping points with a resulting cascade of further potent methane emissions from permafrost.

In summary, it is the dynamics of emissions and absorption which will determine the increase in levels of CO2 equivalents to the atmosphere. Actions now to mitigate the impact of climate change are better than belated action in the future.

**29 April 2020**

**Growth Economics versus Sustainable Economics**

In my emails to SCAN and postings on my personal blog I frequently disparage growth economics with good cause whether that growth economics is our current neoliberal version or a new version, some components of which are a step in the right direction. Any form of growth economics misses the point that continued growth is not sustainable. There are alternative genuine forms of sustainable economics which take into account our thermodynamic and ecological limits.

The Father of steady state/ecological economics is Nicholas Georgescu-Roegen who wrote the book "The Entropy Law and the Economic Process" published in 1971. Before the days of being able to highlight and write notes in a digital book, my copy of Georgescu-Roegen's book is the most highlighted and underlined book in my library. Highlighting really does save a lot of time later on when one wants to quickly refer to a passage of text. I now have an electronic form of his book which I have digitally highlighted by referring to my previous highlighting. I have used the software "Zotere Standalone" to extract my highlighting into a separate document. Each highlighting is accompanied by the page number. I so much wish I had the technology we have today back in the 1970s.

Paul Samuelson referred to Georgescu-Roegen as being "The Economists' Economist." Georgescu-Roegen greatly influenced Herman Daly who took over the cudgels. Herman Daly was once a Senior Economist at the World Bank and he was the editor of the book "Toward a Steady-State Economy" published in 1973. The book included his article "The Steady-State Economy: Towards a Political Economy of Biophysical Equilibrium and Moral Growth." Other authors included Georgescu-Roegen, Kenneth Boulding, William Ophuls, E.F. Schumacher, the co-authors Jorgan Randers and Donella Meadow, and John Cobb. These authors in the 1970s, plus Howard Odum who wrote "Environment, Power, and Society" published in 1971 and "Energy Basis for Man and Nature" published in 1976, formed a core of writers who contributed to the development of ecological/steady state economics.

Some 40 years later Herman Daly and Joshua Farley co-authored the 834-page book "Ecological Economics: Principles and Applications" 2nd edition published in 2004.  Charles A.S. Hall (his PhD on systems ecology was supervised by Howard Odum) and Kent Klitgaard published the book "Energy and the Wealth of Nations: An Introduction to Biophysical Economics" 2nd edition in 2018.

There are many researchers who have published peer reviewed publications in international journals on ecological/steady state/biophysical economics. These include Robert Costanza (his PhD was supervised by Howard Odum), John Gowdy, Cutler Cleveland, Mahe Faber, Kozo Mayumi, Mario Giampietro, Gael Plumecocq, Matthias Ruth etc. etc. The list goes on and I am doing researchers a disfavour by leaving their names out. I have attached one of the reading lists which I have at hand. This list is incomplete.

The point is that steady state/ecological/biophysical economics is a well-established alternative to neoclassical economics and this economic approach is genuinely sustainable.  I look forward to Steve Keen's book on sustainable economics which he refers to in his 9-minute introduction podcast:

"Understanding the real Adam Smith" – Link [here](https://www.patreon.com/posts/understanding-36494575?utm_medium=post_notification_email&utm_source=post_link&utm_campaign=patron_engagement)

The full podcast is available to Patrons.

**1 May 2020**

**Our Renewable Future**

I highly recommend viewing the following 90-minute Vimeo presentation by Richard Heinberg and David Fridley August 2016:

"Our Renewable Future" – Vimeo link [here](https://vimeo.com/179377501)

The introduction of the two presenters takes about 5 minutes and the presentations finishes at about 65 minutes followed by question time.

Take special note of the following:

34 minutes - Prius comparison - high embodied energy with direct energy forming 54% of total energy per mile compared to 80% for petrol/diesel cars.

34 min 30 sec - Purpose of energy.

38 minutes - Exergy and useful work.

41 minutes - Current (2016 and later) focus on supply rather than use.

42 minutes - The need to reduce consumption by simultaneously addressing the easy "low hanging fruit" targets and more difficult targets.

49 minutes - Comparison of electric cars (high embodied energy) and electrified public transport. The need for safe cycleways.

51 minutes - Construction materials problem - cement a major problem.

53 minutes - Mineral resource extraction problem - reference to feasible solutions (as opposed to viable solutions).

57 minutes onwards:

Increase carbon content of soils to offset CO2 emissions.

The task of transition from fossil fuels to renewable energy is daunting. Extra time is needed with the more difficult supply chains.

We need to reduce our total energy consumption by 75%.

65 minutes - Comment by chairperson that the task ahead is indeed daunting.

69 minutes - Richard Heinberg refers to peak oil (there is urgency to make good use of fossil fuels sooner rather than later to enable a transition because the EROI of oil is declining).

The book "Our Renewable Future” can be viewed online – link [here](https://ourrenewablefuture.org)

and an ebook or hard copy can be purchased - see the website for information on purchase.

There is also a 73-minute book launch on YouTube.

"Our Renewable Future book launch with Richard Heinberg and David Fridley" – Link [here](https://youtu.be/FcdBO6RCDrA?t=25)

The content is similar to the Vimeo presentation.

Electric cars with a much lower embodied energy (2-seaters and much lower weight) than a Prius and similar 5-seater cars are available overseas, but not so far in New Zealand. I advocate electrifying our national city-to-city rail network as a priority.

**1 May 2020**

**Planet of the Humans Documentary**

Have a read of Richard Heinberg's review of "Planet of the Humans" documentary:

<https://www.postcarbon.org/review-planet-of-the-humans/>

Richard Heinberg concludes:

"For all the reasons I’ve mentioned, Planet of the Humans is not the last word on our human predicament. Still, it starts a conversation we need to have, and it’s a film that deserves to be seen."

As per my recent postings, the task of transitioning from fossil fuels to renewable energy is indeed daunting and the public needs to be aware of this. Energy use as well as energy sources needs to be addressed. We need to lower our consumption of total energy. This means reducing our current levels of consumption.

**5 May 2020**

**Planet of the Humans Documentary**

The following 38-minute podcast is worthwhile listening to the very end.

Episode 24 "Where Michael Moore is Censored by the Left and Promoted by the Right” - Link [here](https://www.postcarbon.org/crazytown/)

<https://www.postcarbon.org/crazytown/>

The podcast concludes that despite the many flaws in the Planet of the Humans documentary, there are positive outcomes which echo my comments in earlier postings.

**7 May 2020**

**Proforestation is the way to go – Do not cut down mature growing trees**

I highly recommend the key publication “Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good” by William Moonmaw, Susan Masino, and Edward Faison, 2019 – Download link [here](https://www.frontiersin.org/articles/10.3389/ffgc.2019.00027/full)

Current practices do not take into account the dynamics of CO2 emissions and absorption. The above publication describes why timber should be regarded as yet another form of fossil fuels and hence why we should avoid burning timber as an alternative source of energy. Burning timber now results in emissions of CO2 which can only but exacerbate the impact of climate change. Yes, the CO2 emissions from burning trees can be absorbed by planting new trees, but there will be a time lag before those new trees have grown sufficiently to do so. We need to reduce CO2 emission as soon as possible so as to avoid triggering potential tipping points where cumulative emissions of CO2 in the atmosphere cause a cascading irreversible thawing of tundra with subsequent release of methane into the atmosphere.

The dynamics described in the above publication emphasises the need to reduce methane emissions from ruminants as soon as possible. Methane is a far more potent greenhouse gas than CO2 and remains so for a number of decades. It is of little solace that the impact of methane in the atmosphere diminishes after a number of decades when we need to reduce all forms of greenhouse gas emission now so as to avoid triggering potential tipping points.

**9 May 2020**

**Planet of the Humans Documentary**

I have been following a number of articles published on the Internet in response to the Planet of the Humans documentary and I have read both the positive and negative comments posted by the general public on what has been written. I have also tracked down the links to publications which support the claims written in the articles and also links to publications in the comments by the general public which support or counter what has been written in the articles. After doing this exercise, what strikes me is that despite the flaws in the Planet of the Humans documentary, the end result of the responses to this documentary is much needed debate about what is entailed in transitioning from fossil fuels to renewable energy. At long last a growing number of people are questioning what are realistic expectations.

The evidence that climate change is due to CO2 emissions from the burning of fossil fuels is overwhelming. Deniers of climate change are patently delusional to all but those of the same ilk. Most people now agree that we need to transition away from fossil fuels. There are some who regard the above documentary as further support for their dismissal of a viable transition from fossil fuels to renewable energy. So, what is the alternative for these people? There is nuclear energy and geothermal energy. Additional hydro energy is now limited. What is the damage if more people now advocate nuclear energy and/or geothermal energy? All alternative energy sources to fossil fuels need to stand up and be supported on their own merits. I don’t support nuclear energy and at the same time I do not feel threatened by those who advocate nuclear energy.

The right questions are currently being asked by researchers. Energy Returned on Energy Invested (EROI) studies are being carried out on renewable energy sources which now take into account and include the entire system needed to support intermittent solar energy sources. Studies are now being made of the necessary supply chains required to manufacture and maintain solar panels and wind turbines. Researchers are aware that the energy required to mine minerals for magnets for wind turbines and storage batteries will inevitably increase in the future and will increase more rapidly as the scale of mining increases. At the moment we rely on fossil fuels to mine those minerals. The peaking of oil will compound the peaking of minerals which in turn will limit the scale and the rate that we can manufacture solar panels and wind turbines in the future. Researchers are well aware of these limits, but the general public is not. The general public should be aware of these limits so as to avoid false expectations. So far, the general public has been lulled into the false expectation that life can continue the same as before on the assumption that all we need to do is to replace fossil fuels with free solar energy. The true situation is far more complicated.

The Covid-19 pandemic has been extremely damaging, but at the same time it has been a wake-up call that business as usual cannot and should not continue as before. For example, globalisation has made us less resilient and not more resilient. I welcome other wake-up calls. It is timely to question where we are now and where we should be heading in the future.

**13 May 2020**

**Geoengineering to cool the planet is not a solution**

John Doyle is a veteran Member of the EU Foresight Group within the EU Commission. A few days ago, I watched the "End of Normal -Part 1" (31 minutes) webinar discussion between John Doyle and Stuart Scott of ScientistsWarning.TV – YouTube link [here](https://youtu.be/PlZhQJBZ574)

John Doyle outlined the possibility of many more to come versions of Covid-19, a possibility voiced by a number of virologists, and he outlined the implications for humanity.

“The End of Normal” Part 2 (35 minutes) webinar discussion between John Doyle (see below) and Stuart Scott of ScientistsWarning.TV has just been released – YouTube link [here](https://youtu.be/pD3hTphM0xM)

Take note of John Doyle's mention of recent reductions of short-term particulates into the atmosphere caused by reductions in the burning of dirty fossil fuels as a result of Covid-19. Particulates in the atmosphere have only a short-term cooling effect. Once those particulates in the atmosphere disappear to the ground, current increases in global average temperatures accelerate. Extreme temperatures in combination with a high humidity can and will cause heat death of animals and humans. John Doyle's concern about potential deaths in Europe during the coming Northern hemisphere summer are well founded. The Guardian describes examples of deaths caused by heat stress here and here

https://www.theguardian.com/global-development/2019/oct/02/revealed-hundreds-of-migrant-workers-dying-of-heat-stress-in-qatar-each-year

https://www.vox.com/world/2019/6/26/18744518/heat-wave-2019-europe-france-germany-spain

"Europe has a deadly history with heat

This week’s sweltering weather is concerning because there are several key factors that make people in Europe vulnerable to extreme heat.

These factors converged to a devastating effect in the summer of 2003, when a [heat wave](https://www.unisdr.org/files/1145_ewheatwave.en.pdf) baked the continent with temperatures 13 degrees above the average normal for the region. The heat killed at least 30,000 people caused 13 billion Euros in financial damages. Some estimates put the death toll as high as [70,000](https://www.ncbi.nlm.nih.gov/pubmed/18241810). At the time, it was the hottest summer for Europe since the [16th century](https://go.redirectingat.com?id=66960X1516588&xs=1&url=https%3A%2F%2Fwww.nature.com%2Farticles%2Fnature03089&referrer=vox.com&sref=https%3A%2F%2Fwww.vox.com%2Fworld%2F2019%2F6%2F26%2F18744518%2Fheat-wave-2019-europe-france-germany-spain)."

In the book "Climate Shock: The Economic Consequences of a Hotter Planet" by Gernot Wagner and Martin L. Weitzman, 2015, the authors voice a concern that a rogue nation might, in desperation against extreme increases in temperatures in that country, undertake a unilateral decision to use geoengineering and release SO2 particulates into the atmosphere to cool the planet in the same way as does eruptions of volcanoes. This relatively inexpensive method of cooling the planet, however, does not address the causes and sources of climate change. This action would merely ameliorate the symptoms.

Geoengineering runs the risk of over-cooling the planet causing a new ice-age. SO2 particulates are relatively short-term pollutants in the atmosphere and, once geoengineering is initiated, the process of geoengineering would need to continue so as to avoid a sharp increase in global temperatures. What is of especial concern to me is that Initial success in reducing global temperatures due to geoengineering might provide a rationale for some countries to continue burning fossil fuels. As soon as we start to rely on geoengineering to cool our planet, the need to continue geoengineering would escalate should the burning of fossil fuels continue. CO2 emissions into the atmosphere would continue to accumulate and progressively more SO2 would need to be seeded into the atmosphere to prevent further rises in global temperatures. In the long term, the ability to continue geoengineering would decline as inevitable peaking of fossil fuels make all fossil fuel based activities more and more energy cost prohibitive. Crunch time of rapid increases in global temperatures would come as the ability to seed the atmosphere with SO2 declines. The rise in global temperatures by then would be irreversible and our current existential threat to all life forms on Earth would be realised.

Given the above potential scenario, the need for climate change mitigation action becomes even more urgent. If all nations on Earth are unable to cooperate in reducing greenhouse gas emissions, then geoengineering might be the only way to reduce global temperatures should tipping points be triggered due to insufficient action. But geoengineering is not a solution should we continue to burn fossil fuels.

I am not in favour of nuclear energy and, besides, it seems that nuclear energy is currently not economically viable compared to alternative renewable forms of energy based on solar energy. If we do not reduce our current levels of material consumption, then solar energy alone cannot provide a sufficient substitute for our current levels of energy provided by fossil fuels. If we are unable to cooperate in reducing greenhouse gases and reduce our current levels of consumption, then we might be left with the options of choosing between or both geoengineering and nuclear energy, each with its own attendant risks. Delays in action to mitigate climate change will ultimately result in fewer options of any kind. We not only have climate change to contend with. We also have the peaking of fossil fuels to contend with. The energy returned on energy investment (EROI) of all forms of fossil fuels can but only decline over time. All forms of action such as investments in renewable energy and infrastructure requires the use of energy. Declining EROI’s of fossil fuels and increasing energy costs to mine minerals will make any transition progressively more difficult over time. Now is the time to make the best use of our free gift of fossil fuels for investment in a transition to renewable energy and infrastructure rather than consumption.

**14 May 2020**

**Sustainable Economic Growth versus a Sustainable Economy**

There have been recent debates in the news about the direction New Zealand should follow in its economic recovery from Covid-19. In the TV programme, Q & A, Paul Goldsmith spoke about the need for sustainable economic growth. He and many other Members of Parliament simply do not understand that sustainable economic growth is a physical impossibility and that sustainable pathways of investment are needed to ensure a sustainable economy in the future.

What can one do to change this mindset? I was a Senior Lecturer in the Department of Property, The University of Auckland, for 10 years during which I rubbed shoulders with fellow staff members with PhDs in finance and property economics who based their lectures and research on neoclassical economics. The Department of Property joined the Business School which churned out graduates with BCom and MBA degrees. Once again, these university courses were based on neoclassical economics. The text books at High School in New Zealand are also based on neoclassical economics. It is the education system that perpetuates the myths of neoclassical economics, an ideology which promotes the goal of economic growth. (See Steve Keen's book "[Debunking Economics](https://www.amazon.com/Debunking-Economics-Naked-Emperor-Dethroned-ebook/dp/B00A76WZZK/ref=sr_1_1?dchild=1&keywords=debunking+economics&qid=1589400025&s=books&sr=1-1)").

Paul Samuelson's textbook based on neoclassical economics dominated universities around the world for many decades. Gregory Mankiw has been a more recent writer of text books based on neoclassical economics. In 2011, students staged a walkout on Gregory Mankiw's Economics 101 lectures in protest against the narrowness and lack of reality of the economic course. By 2014 there was a groundswell of university students demanding to be taught relevant economics. The Guardian covered this movement as follows – Link [here](https://www.theguardian.com/education/2014/may/04/economics-students-overhaul-subject-teaching):

"Economic students from 19 countries have joined forces to call for an overhaul of the way their subject is taught, saying the dominance of narrow free-market theories at top universities harms the world's ability to confront challenges such as financial stability and climate change.

In the first global protest against mainstream economic teaching, the International Student Initiative for Pluralist Economics (ISIPE) argues in a letter to the Guardian that economics courses are failing wider society when they ignore evidence from other disciplines."

The above movement did not transpire over to New Zealand.

All disciplines such as physics and economics initially tend to resist new ways of thinking. Changes in thinking is more rapid in physics than economics because physics is a science which is based on empirical evidence which is less easily denied. Neoclassical economists tend to ignore empirical evidence which counters their prevailing theory. It has been said that changes in ideology eventually takes place because adherents of old ideology eventually pass away and are replaced by a younger generation more open to new ideas. When it comes to the ideology of economic growth, adherents of this ideology have, in addition, personal financial reasons to resist any changes which challenge or threatens their own self interests.

We are running out of time for adherents of economic growth to pass away. We need to accelerate changes from the ideology of neoclassical economics to that which is more relevant based on physical realities. What is needed are jolts of reality. Nature will provide those for us if we should be unwilling to accept and take on board science-based evidence that economic change is necessary.

**27 May 2020**

**Review of 2040 Documentary**

I have just viewed the documentary “2040” (1 hr 32 min) on [Vimeo](https://vimeo.com/ondemand/2040doco) and purchased streaming on demand for US $13.56. One-time hire is about US $5.

Am I pleased I paid $13.56 as opposed to $5 to view the documentary? Yes, it was worthwhile for me. The documentary is beautifully crafted, positive and uplifting, and I can view it again as many times as I want to.

Did I learn anything new? No, and I doubt whether any content in the documentary would be new for fellow committee members of our Seniors Climate Action Network ([SCAN](https://www.facebook.com/groups/964056880274284)).

What was the most valuable aspect of the documentary for me? The documentary highlighted what was left out and not addressed. We all need dreams about our future, and the documentary covers a number of solutions to mitigate climate change etc. What the documentary does not address is why these solutions are currently not put into practice at the scale and speed necessary over the next 20 years in order to realise the dreams of the documentary. The documentary does not address the impediments against acting upon solutions and what actions are needed to remove or reduce those impediments. This is a role which SCAN and like-minded organisations need to adopt - identifying the impediments and identifying how to remove those impediments.

From my point of view, the 2040 documentary is overly naive. Excessive consumerism and population growth are two of the major underlying causes of our global problems, including climate change. The documentary paints a pretty picture of the future in 2040 when, by replacing fossil fuels with renewable energy and replacing current agricultural practices with regenerative farming and local food production, we are then able to more or less enjoy the same comfortable lives that we have now with the bonus of a more sophisticated level of technology. The documentary confuses feasibility with viability.

Yes, we all need dreams. In order to have action, we need to have belief. But at the same time, we need to be realists. Solutions need plans of action which map out what is not only feasible but also viable at the scale and speed necessary to implement, identify barriers and impediments, and then identify how to remove those barriers and impediments which oppose necessary action or contribute to inertia.

**25 June 2020**

**My Reply to Seniors Climate Action Network (SCAN): Wise Response to the New Zealand Fast Track**

Thanks for a copy of the [Wise Response](http://wiseresponse.org.nz) submission on Covid-19 Recovery (Fast-Track Consenting) Bill to the Environment Select Committee. Much appreciated. In this submission Wise Response advocates a New Zealand stimulus package which addresses and the need to progress with a transition from fossil fuels to renewable energy and infrastructure. This submission as of today, 25 June 2020, has yet to be posted on its website. I have downloaded a number of earlier submissions and related publications. Wise Response is doing a great job and the above submission is timely – for example see the following recent global news items:

[**The Guardian 18 June 2020**](https://www.theguardian.com/environment/2020/jun/18/world-has-six-months-to-avert-climate-crisis-says-energy-expert)

**World has six months to avert climate crisis, says energy expert. International Energy Agency chief warns of need to prevent post-lockdown surge in emissions**

**[The Guardian 13 June 2020](https://www.theguardian.com/environment/2020/jun/13/climate-worst-case-scenarios-clouds-scientists-global-heating)**

**Climate worst-case scenarios may not go far enough, cloud data shows. Modelling suggests climate is considerably more sensitive to carbon emissions than thought.**

There is another more disturbing and somewhat alarmist news item published on an activist website. The sources referred to are impeccable - peer reviewed publications:

[**Voice of Action website 24 June 2020**](https://voiceofaction.org/collapse-of-civilisation-is-the-most-likely-outcome-top-climate-scientists/?fbclid=IwAR2KLRClKfgZNu420WFB0MEyxRDXnVqelRY-8aNjwRbG09W4O-g85ATUGiI)

**‘Collapse of civilisation is the most likely outcome’: top climate scientists. The world’s most eminent climate scientists and biologists believe we’re headed for the collapse of civilisation, and it may already be too late to change course.**

The website [Progressive Money Canada](https://progressivemoney.ca) provides extensive and thorough documentation on how money is created by private banks and the advantages of restricting this right to government owned central banks. A government can borrow from itself at zero interest and does not need to repay this "debt". An injection of government instead of private bank created money with interest to be repaid will not be inflationary when the economy requires a stimulus package.

The need for urgent action and the means of doing so are inextricably linked. On 21 May 2020 Wise Response wrote an open letter to our Minister of Finance titled "[Monetary Policy, Government Debt and Bond](http://wiseresponse.org.nz/2020/05/25/open-letter-to-nz-minister-of-finance-re-monetary-policy-government-debt-and-bonds/)". Monetary reform is necessary, especially in the wake of Covid-19.  Government debt does not need to be repaid and we have the means of investing in a transition from fossil fuels to renewable energy and infrastructure now.

**11 July 2020**

**Modified Reply to SCAN Members: Modern Monetary Theory**

A member of SCAN recently sent an email to fellow SCAN members referring them to an article in *The Conversation* titled “[The Spending Splurge Matters regardless of what Modern Monetary Theory says](https://theconversation.com/the-spending-splurge-matters-regardless-of-what-modern-monetary-theory-says-137241?)”,

The member was particularly drawn to the last two sentences:

"Martin Wolf of the Financial Times said during the crisis that modern monetary theory was both right and wrong. It was right, because there is no simple budget constraint. It was wrong, because it would prove impossible to manage the economy sensibly once politicians believed there was no simple budget constraint."

The member found this statement to be totally mystifying.

“My translation of the last sentence in the article: Everyone has to keep pretending there is a budget constraint (even though there isn't) if politicians are to manage the economy "sensibly" or the banking and debt-based lending system (the basis of our economy) will vanish into thin air like the mirage it is. Please tell me I am wrong.”

My reply (modified) was as follows:

“Before I reply to your query, please note that I not an expert on monetary theory. Monetary theory is complicated enough in itself to fully understand, and even more so when there are different strands of theory. I have read a number of books both historical and recent on monetary theory and I have collected a number of peer reviewed publications on the subject which I am currently processing. I do not pay much heed to magazine and website articles which can be a garbled version of monetary theory or parrot quotations out of context. I pay more heed to peer reviewed publications and economists who incorporate realism into their research and compare their theories against data. Having said that however, it is of note that econometrics as a method to analyse data has a dubious reputation. There is a standard joke that if an econometrician has data at hand, then he has a publication in hand. It is possible to generate, say, 10 random numbers, place them on a number line, then seek an equation which will pass as close as you wish by each random number and then claim a relationship which actually does not exist. The theory against which data is compared must also be realistic. Massaging the theory to fit the data can lead to spurious theory. For example, to protect the theory that the planets rotate around the Earth instead of the sun, early astronomers incorporated epicycles into their model of the planetary system to improve the predictive precision of their spurious model. Their epicycle models were more precise than Copernicus’s more realistic model which was based on the planets rotating around the sun in perfect circles until Kepler later on established that the planets actually travel around the sun in ellipses.

I digress. I take special heed of [Professor Steve Keen's research](https://en.wikipedia.org/wiki/Steve_Keen) because he has modelled both the government and private sector banking system and he has compared his results against real data. My understanding of monetary theory is based mainly on Steve Keen's publications backed up by a number of other heterodox economists. The most common prevailing theory of monetary theory is that only governments create money despite evidence to the contrary. Martin Wolfe might be of that school of monetary theory.

According to Steve Keen, there are restrictions on how rapidly governments should create money. There will be inflation if too high a rate of creation of money is injected into an economy which is running at full employment and full capacity. An injection of money by the government during periods when there is high unemployment and the economy is not running at full capacity will not cause uncontrolled inflation. What is definite is that government debt at a zero interest rate does not need to be repaid. Austerity measures to repay government debt are totally unnecessary. Private debt is an entirely another matter and Steve Keen advocates a Debt Jubilee to reset the economy.

Returning to the SCAN member’s above question, if politicians should accept that government debt at zero interest does not need to be paid, and if the same politicians are aware that indiscriminate injections of newly created money injected into the economy would incur inflation, would politicians indeed vote to overstep these restrictions?  That possibly depends on whether the public is aware of and understands what the government is doing. In a truly democratic society, there would be appropriate checks and balances.

I pose a few more questions of my own:

1. What would the public's reaction be if it were widely known that when governments apply quantitative easing to bail out banks and insurance companies and corporations "too big to fail", the money injection does not necessarily filter through the economy for the public good, but is instead frequently used by corporations to buy back shares to boost their own share prices?

2. What would the public's reaction be if it were widely known that private commercial banks have the legal right to create money and charge interest on it over and above administration costs and normal profit?

3. What would the public's reaction be if it were widely known that money deposited in a bank account belongs to the bank and not the depositor. The depositor is not at the front of the queue of creditors should the bank fold. This is the case in Canada and might also be the case in New Zealand.

I have said before that action follows belief. Many people are unaware of the original bases of their beliefs and whether those bases are indeed true or not. There are those who know that they know, those who know that they don't know, those who don't know that they know, and those who don't know that they don't know. I hope that I am one of those who knows that he doesn't know and I am attempting to find out what I don't know. There are large numbers of people in society who don't know that they don't know despite any evidence put before them. It is so difficult to change entrenched belief systems and hence necessary action in the face of responding financially appropriately to our current pandemic and climate change predicament.

**19 July 2020**

**“The Many Problems of Economics” – Interview with Professor Steve Keen**

I recommend viewing the following 2018 YouTube Video:

"[The Many Problems of Economics](https://youtu.be/klNYqGR6E8Q)" - an interview with Steve Keen

Followed by Steve Keen’s 2019 more detailed and technical presentation on YouTube:

“[Keen Berlin 2019 Reality Vs Myth](https://youtu.be/auSh9f8krts)”

The subjects discussed in the first video are directly related to our current political situation in New Zealand. There is a need for government spending to support business and citizens during our recovery from our COVID-19 lock down while, at the same time, investment in appropriate infrastructure would enable a transition from fossil fuels to renewable energy. Both forms of spending are necessary and are mutually compatible in that construction of infrastructure requires workers. Deficit spending, the accumulation of which is the government debt, is a debt which does not need to repaid back to itself. When the economy requires a boost, deficit spending is not inflationary.

Steve Keen points out that the United States government over the last 120 years spent an average of about 2.5% of GDP more each year than it received in taxes each year. This excess of spending over taxes formed a cash injection into the economy which resulted in additional benefits for the country. The government debt is simply a record of deficit spending which does not need to be repaid. A government surplus in any one year actually takes money out of the economy and results in unnecessary austerity. Government debt is not the same as private or commercial debt which is expected to be repaid along with interest. Deficit spending is not the bogeyman that many neoclassical economists claim and many politicians parrot. We can ill afford political policies of austerity to repay government debt when there is urgency to address the need to transition from fossil fuels to renewable energy. Yes, we do have an ongoing pandemic to contend with, but climate change will escalate if we do not reduce our reliance on fossil fuels now.

**20 July 2020**

**Is There Intelligent Life on Earth?**

A few weeks ago, I purchased Carl Sagan’s book “*Pale Blue Dot: A Vision of the Human Future in Space*” for $1 from Habitat/Restore off Crawford Street, Dunedin. I am finding the book to be a fascinating read full of high-quality photographs of the planets in our solar system, stars, and galaxies all taken from outer space by a number of spacecrafts and the orbiting Hubble telescope.

One chapter in the book is titled “*Is There Intelligent Life on Earth?*” This chapter describes the perspective of an alien spacecraft visiting our solar system seeking to determine whether there is life on any of the planets. A galactic ethic allows the alien spacecraft to orbit each planet, but strictly forbids a landing.

The spectrometer on board the alien spacecraft enables detection of gases in the atmosphere of each planet. By a process of analysis of the existence and proportions of each of these gases, the aliens are able to establish whether, at minimum, there is a microbial level of life on each planet. The aliens orbit the planet Earth where they detect some form of life. Magnified photographs of the surface of the planet with various filters reveal that a life form has developed sufficiently to a level of technology which has modified the surface of the planet. Closer examination reveals that the technology of the organism is also in the process of changing the planet’s climate which threatens all life forms on the planet. The aliens ponder whether this dominant organism has noticed what is happening. Is this organism oblivious as to its own and fellow organisms’ fate? Is it unable to cooperate and work together on behalf of the environment that sustains all organisms on the planet? Before flying to the next planet, the aliens are in doubt as to whether there is intelligent life on Earth.

The alien’s spacecraft above used the same spectrometer technology that was on board the *Galileo*, the 1990 NASA spacecraft designed to explore the giant planet Jupiter, its moons, and rings. To get to Jupiter, the *Galileo* had to fly close by Venus and then twice around Earth in order to accelerate fast enough to escape the gravities of these planets and fly towards Jupiter. The *Galileo* passed within 960 kilometres above the surface of Earth. Spectrometer analysis and photographs of our planet Earth by orbiting spacecraft and the space station since 1990 have documented further decline as observed in 1990 – loss of top soil to the oceans, loss of vegetation, loss of ice on the mountains and around the Arctic and Antarctic circles, rising CO2 levels accompanied by a rising average global temperature, and increasing desertification. Some 30 years after the *Galileo* left Earth, we should be asking the same question as the above Aliens in Carl Sagan’s story. Does humankind have the sufficient and necessary intelligence to continue survival on our planet Earth?

The insect world such as bees and ants have evolved into super organisms which cooperate to ensure continued survival. Humankind initially evolved as tribes restricted in numbers to fewer than 150 people in each tribe. Each member of the tribe knew every other member in the tribe and also had an intimate knowledge of their immediate surroundings and the role that each flora and fauna played in that ecosystem.

Humankind successfully survived for many thousands of years as tribes until the start of the agricultural revolution some 10,000 years ago. The surplus that agriculture enables led to the rise of cities, increases in population densities, and inevitably to exponential growth in populations when the discovery and use of fossil fuels led to innovation in technology which enabled an increase in the level of surplus. Greater surpluses have also led to greater conflict as to who should benefit from that surplus.

Although our technology has evolved greatly since the use of fire and stone tools, especially over the last three centuries, at the biological level Humankind has not evolved and adapted sufficiently to cooperate without conflict with groups in numbers far greater than the tribal level of about 150 people. The problems we are currently facing and having to deal with are social and political. We have the technology and currently the necessary and sufficient energy in the form of fossil fuels to resolve our problem of climate change by transitioning from fossil fuels to renewable energy. Unlike other organisms on Earth, we also have the mental capacity and means to deliberately restrict the sizes of our populations. We are not bound by the edict of instinct to procreate ourselves out of existence.

The longer we delay in transitioning from fossil fuels to renewable energy, the more difficult it will become due to the inevitable peaking of all forms of fossil fuels and also the peaking of the mining of minerals necessary for investment in infrastructure required to generate renewable energy. Our current COVID-19 pandemic is exacerbated by our current high population densities in cities and our current dependence on globalised supply chains which are accompanied by human-to-human connections between countries. Do we have the necessary intelligence to look beyond our current immediate focus on dealing with what could transpire to be but one of a series of ongoing pandemics? Our problem of climate change is not going to go away in the meantime and will become more dire unless we act now to transition from fossil fuels to renewable energy.

**23 July 2020**

**Modified Copy of Email to SCAN: Modern Monetary Reform**

In my previous emails to SCAN and at our recent SCAN meeting I spoke of the need for the general public to be informed and educated that government debt does not need to be repaid. The media and politicians in New Zealand describe government debt as being a burden that does need to be repaid. I am not alone in advocating for monetary reform. There is a growing global movement for monetary reform and change for a new economics based on physical reality instead of wishful and fanciful simplifying assumptions that underpin current mainstream economics. For example, see Steve Keen’s YouTube presentation “*Manchester 2019 The Magnificent Failure of Neoclassical Economics*” link [here](https://youtu.be/74ya1Y9NM_k)

The New Zealand organisation *Wise Response* recently wrote a public letter to the New Zealand Minister of Finance – link [here](http://wiseresponse.org.nz/2020/05/25/open-letter-to-nz-minister-of-finance-re-monetary-policy-government-debt-and-bonds/) This letter on government debt echoes the same messages that I have written in my emails to SCAN and posted in this personal blog section of my website. I note that Professor Tim Hazledine, an economist at The University of Auckland, is a key member of *Wise Response* and I assume that he advised on the content of the above *Wise Response* open letter. Like Professor Steve Keen, Professor Tim Hazledine has a reputation for being a renegade economist who dares to challenge the orthodoxy and dogma of main stream economics. My query in a previous email was whether *Wise Response* was going to further inform/educate the general public that government debt does not need to be repaid. *Wise response* has greater credibility than SCAN to undertake this task.

At our meeting it was suggested that an appropriate economist be interviewed about government debt on radio. In the article "[*Unpacking our Fear of Government Debt*](https://www.scoop.co.nz/stories/HL2005/S00177/unpacking-our-fear-of-government-debt.htm)" in *Scoop* on 21 May 2020, Keith Rankin, a New Zealand economist,  refers to "comments made, on Monday 11 May, by four economists with substantial media profiles, from Radio New Zealand's [Nine to Noon](https://www.rnz.co.nz/national/programmes/ninetonoon/audio/2018745958/economy-showing-strain-are-welfare-changes-coming) (hosted by Kathryn Ryan), and TVNZ's [Q+A](https://www.tvnz.co.nz/shows/q-and-a/clips/tax-increases-to-cover-covid-19-bill-are-inevitable-economist) (hosted by Jack Tame)." After viewing a number of interviews of Steve Keen and other heterodox economists, I add my own observation that no matter how accomplished an interviewer might be, if an interviewer does not have a strong understanding of the subject matter, then the quality of the interview is inferior because the interview is tainted by the slant and bias of the interviewer's questions and comments on replies. Steve Keen was recently interviewed by Bernard Hickey on Radio New Zealand about the need for a Debt Jubilee which involves making good use of government debt – link [here](https://www.rnz.co.nz/programmes/two-cents-worth/story/2018751387/the-case-for-a-modern-debt-jubilee) Unlike a number of interviewers, Bernard Hickey has a solid background in economics and he was able to conduct an intelligent and well-informed interview.

At our recent SCAN meeting, the political party Social Credit was mentioned, and I cringed to think that many members of the public in New Zealand would too easily knee-jerk associate Modern Monetary Reform with the Social Credit movement that was mocked by many in New Zealand as being "Funny Money". Modern Monetary Reform has an impeccable heritage backed by a number of generations of credible international economists. These economists were and are not necessarily mainstream, but nonetheless have provided a necessary realistic and rigorous approach to economics which is often completely lacking by a number of leading mainstream economists. The fantasy assumptions of William Nordhaus, "Nobel" Prize Winner in Economics, is a prime example of an erring mainstream economist. See Steve Keen’s YouTube presentation “[Economic Analysis of Climate Change: The Right Way and the Fraudulent Way](https://youtu.be/aoFiw2jMy-0)”.

There are a number of global organisations which advocate modern monetary and economic reform. [*Positive Money*](https://positivemoney.org) and [*New Economics Foundation*](https://neweconomics.org) are but two which come to mind. My focus has been on identifying, downloading, and processing key peer reviewed international refereed journal publications in a number of disparate research areas of sustainability instead of relying on information provided by secondary sources such as magazines, newspapers, and website articles. However, peer reviewed research publications often need a translation, so summary publications with no loss in rigour are very useful. I have therefore attached two summary publications on modern monetary reform. *Positive Money* publication download [here](https://www.insearchofsteadystate.org/downloads/Sovereign-Money,-An-Introduction-Dyson-Positive-Money-2016.pdf) *New Economics Foundation* publication download [here](https://www.insearchofsteadystate.org/downloads/Creating-New-Money,-a-monetary-reform-for-the-information-age-Huber-New-Economics-Foundation.pdf)

**28 August 2020**

**Modified Copy of Email to SCAN: Modern Monetary Theory Continued**

There is currently a prevailing myth that government debt is a burden on taxpayers and that government debt needs to be repaid. A balanced government budget is commonly regarded as being responsible government housekeeping and that annual deficits should be avoided even if this should entail austerity measures resulting in reductions in government spending on public services.

At our SCAN meeting on 21 July, we had a discussion about government debt and the need for the general public to be aware that government debt does not need to be repaid. This is especially important given the current need for government to provide support for businesses and households during and after the COVID-19 lockdowns. Government also needs to invest heavily in a transition from fossil fuels to renewable energy and infrastructure. There is a risk that unnecessary austerity measures to pay back government debt could be adopted by a misinformed government.

At our SCAN meeting I agreed to identify a number of suitable videos for general public viewing which address the government deficit myth. The following is a compilation of videos which range from the simple to the more complete and subsequently more complex. Recommended podcasts and books are also included.

**Videos - Simple Description of Modern Monetary Theory and Reform**

‘Why we need to debunk the 'deficit myth' - Stephanie Kelton – Link [here](https://youtu.be/d_udbs-wuDA)

‘Modern Money Theory for Beginners’ - L. Randall Wray – Link [here](https://youtu.be/E5JTn7GS4oA)

‘Banking 101 Six Part Series’ – Positive Money – Link [here](https://positivemoney.org/how-money-works/banking-101-video-course/)

‘Fractional Reserve Banking... not what the textbooks tell you’ - Positive Money – Link [here](https://youtu.be/CI5CFQXJxcA)

‘Future of Money Part 3’ - Steve Keen – Link [here](https://youtu.be/8MLj-UMQE4c)

**Videos - More Complex Description of Modern Monetary Theory and Reform**

‘Banks Are Not Intermediaries of Loanable Funds and Why This Matters’ - Michael Kumhof – Link [here](https://youtu.be/OgsEyM82oCE)

‘Significance of Monetary Reform’ - Michael Rowbotham – Link [here](https://youtu.be/rzqDEBHPwcs)

‘The Production of Money- how to break the power of bankers’ - Ann Pettifor – Link [here](https://youtu.be/P5RQgbBa-jk)

‘The Secret of Oz’ – Link [here](https://youtu.be/swkq2E8mswI)

**Videos - Steve Keen on Money and the Banking System**

‘Meet the Renegades’ – Link [here](https://youtu.be/KIaXVntqlUE)

‘How Economics Became a Cult’ – Link [here](https://youtu.be/JeplRmADW3E)

‘A Conversation with Steve Keen Part 1 - The Debt Problem’ – Link [here](https://youtu.be/fn0zNIkepbA?list=TLPQMjUwODIwMjBBJJlq_dPHvw)

‘A Conversation with Steve Keen Part 2 - From Central Bankers To MMT’ – Link [here](https://youtu.be/KgJOuA9Bkto?list=TLPQMjUwODIwMjBBJJlq_dPHvw)

https://youtu.be/KgJOuA9Bkto?list=TLPQMjUwODIwMjBBJJlq\_dPHvw

‘Steve Keen — We Need a Private Debt Jubilee’ – Link here

‘Modern Debt Jubilee or system meltdown’ – Link [here](https://youtu.be/AZeyOyW1US8?list=TLPQMjUwODIwMjBBJJlq_dPHvw)

‘Economists Refuse to Believe Banks, Debt, Money Are Important’ – Link [here](https://youtu.be/79oKH_x_XEk?list=TLPQMjUwODIwMjBBJJlq_dPHvw)

**Podcasts on Money and Debt Jubilee**

‘The Case for a Modern Debt Jubilee’ - Steve Keen interviewed by Bernard Hickey RNZ 2020 – Link [here](https://www.rnz.co.nz/programmes/two-cents-worth/story/2018751387/the-case-for-a-modern-debt-jubilee)

https://www.rnz.co.nz/programmes/two-cents-worth/story/2018751387/the-case-for-a-modern-debt-jubilee

‘Can MMT solve the COVID-19-19 debt problem?’ – Steve Keen interviewed by Phil Dobbie – link here

<https://youtu.be/xmar3tSvIOo>

**Seven Sharp Videos and Webinars**

‘Positive Money on Seven Sharp 2018?’ – Link here

The main content of the video was about how private commercial banks create money each time a household takes out a mortgage. At 3 min 14 secs the economist Shamubeel Eaqub stated that "This is what is taught in 1st year economics". At 5 min 19secs Greg Boyed was dismissive about monetary reform by government. At 6 min 46 secs in a summary of the interview the female presenter stated that in a survey of Facebook responses "most people were aware this was the case".

‘Seven Sharp – Govt spends billions to keep the economy intact - where does the money come from?’ – Link [here](https://www.tvnz.co.nz/shows/seven-sharp/clips/govt-spends-billions-to-keep-the-economy-intact-where-does-the-money-come-from)

‘Dr Geoff Bertram: How do we pay for Covid-19?’ NZ Webinar 2 hours 6 min – Link [here](https://youtu.be/T2cEhUDfTII)

0:00:00 Introduction

0:04:45 The Austerity Myth

0:27:02 Discussion

0:47:15 Money Creation, the "Debt Burden" and Who Pays

1:06:55 Discussion

1:14:46 Channels for Money Creation

1:22:50 Discussion

1:26:15 Post-Covid-19: Heading Off Austerity

1:36:25 Discussion

‘Steve Keen: Covid-19 and the debt time bomb’ NZ Webinar 1 hr 28 min – Link [here](https://youtu.be/VbXL02s1O7g)

**Lecture Video Series on Economics Including Government and Private Debt**

Steve Keen’s website link [here](http://www.debtdeflation.com/blogs/lectures/)

**Recommended Books on Modern Monetary Theory and Reform**

Link [here](https://www.insearchofsteadystate.org/books-money.html)

**02 September 2020**

***The appallingly bad neoclassical economics of climate change*' by Steve Keen 2020**

**Abstract**

Forecasts by economists of the economic damage from climate change have been notably sanguine, compared to warnings by scientists about damage to the biosphere. This is because economists made their own predictions of damages, using three spurious methods: assuming that about 90% of GDP will be unaffected by climate change, because it happens indoors; using the relationship between temperature and GDP today as a proxy for the impact of global warming over time; and using surveys that diluted extreme warnings from scientists with optimistic expectations from economists. Nordhaus has misrepresented the scientific literature to justify the using a smooth function to describe the damage to GDP from climate change. Correcting for these errors makes it feasible that the economic damages from climate change are at least an order of magnitude worse than forecast by economists, and may be so great as to threaten the survival of human civilization.

Download publication [here](https://www.tandfonline.com/doi/full/10.1080/14747731.2020.1807856)

**03 September 2020**

**The buzzword expression “Circular Economy”**

I am a purist when it comes to the buzzword expression "circular economy". A modern economy is defined as being a system of production and consumption of goods and services assisted by the exchange of money. Over the past number of decades, most neoclassical textbooks have depicted the economy in diagrams as being circular and self-contained. This depiction has ignored the role of the environment as a source of energy and materials and also as a sink. Our modern economy has inward flows of energy and materials and outward flows of degraded energy in the form of heat and waste, some of which pollutes the environment. Within the economy, energy and materials are transformed into useful forms for humans and money is exchanged for goods and services. The flow of money within the economy can be safely regarded as being circular, but not energy and materials. To think otherwise entertains the misconception of an economy being like a self-contained perpetual motion machine.

The neoclassical circular depiction of the economy has long ignored the source of energy and materials which enters the economy and the harmful externalities that exit. Some protagonists of a circular economy claim that we can decouple energy and materials from the economy. This claim is a nonsense. There are thermodynamic and physical limits to the extent that the efficiency of processes and recycling can be achieved. By all means we need to reduce the scale of resources needed to sustain the economy by making more efficient use of those resources and we also need to reduce the scale of our waste by greater levels of recycling. We should call a spade a spade and simply say what we need to do instead of conjuring up a buzzword which continues the misconception that the economy is like a self-contained perpetual motion machine.

In ecosystems, dispersal of necessary minerals for life in the form of decaying animals and vegetation sustain future generations of life. Modern civilisations require concentrations of materials which inevitably become dispersed to the environment regardless of our efforts to recycle. Higher levels of recycling require higher levels of energy, be it stocks of fossil fuels or flows of solar based energy which are both limited. For modern civilisations to exist at a technology level way beyond the stone tools of the hunter-gatherer, there will always be waste which flows out of the economy into the environment. The environment can accommodate a degree of waste, but we need to ensure the level of our waste does not exceed the environment's capacity to assimilate that waste.

No matter how efficient we become in our production processes and recycling, our population levels and levels of technology in the future will ultimately determine the scale of our waste into the environment. Our access to renewable energy will limit our level of technology.

**08 September 2020**

**Is Green Growth Possible?**

I recommend reading the publication “Is Green Growth Possible?” by Jason Hickel and Giorgos Kallis, 2019 – Download from ResearchGate [here](https://www.researchgate.net/publication/332500379_Is_Green_Growth_Possible)

I have included the Abstract and Conclusion of this publication between the lines of asterisk below:

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**ABSTRACT**

The notion of green growth has emerged as a dominant policy response to climate change and ecological breakdown. Green growth theory asserts that continued economic expansion is compatible with our planet’s ecology, as technological change and substitution will allow us to absolutely decouple GDP growth from resource use and carbon emissions. This claim is now assumed in national and international policy, including in the Sustainable Development Goals. But empirical evidence on resource use and carbon emissions does not support green growth theory. Examining relevant studies on historical trends and model-based projections, we find that: (1) there is no empirical evidence that absolute decoupling from resource use can be achieved on a global scale against a background of continued economic growth, and (2) absolute decoupling from carbon emissions is highly unlikely to be achieved at a rate rapid enough to prevent global warming over 1.5°C or 2°C, even under optimistic policy conditions. We conclude that green growth is likely to be a misguided objective, and that policymakers need to look toward alternative strategies.

**CONCLUSION**

This review finds that extant empirical evidence does not support the theory of green growth. This is clear in two key registers. (1) Green growth requires that we achieve permanent absolute decoupling of resource use from GDP. Empirical projections show no absolute decoupling at a global scale, even under highly optimistic conditions. While some models show that absolute decoupling may be achieved in high-income nations under highly optimistic conditions, they indicate that it is not possible to sustain this trajectory in the long term. (2) Green growth also requires that we achieve permanent absolute decoupling of carbon emissions from GDP, and at a rate rapid enough to prevent us from exceeding the carbon budget for 1.5°C or 2°C. While absolute decoupling is possible at both national and global scales (and indeed has already been achieved in some regions), and while it is technically possible to decouple in line with the carbon budget for 1.5°C or 2°C, empirical projections show that this is unlikely to be achieved, even under highly optimistic conditions.

The empirical evidence opens up questions about the legitimacy of World Bank and OECD efforts to promote green growth as a route out of ecological emergency, and suggests that any policy programmes that rely on green growth assumptions – such as the Sustainable Development Goals – need urgently to be revisited. That green growth remains a theoretical possibility is no reason to design policy around it when the facts are pointing in the opposite direction.

Of course, we need all of the technological innovations we can get, and we need to gear government policy toward driving these innovations, but this will not be enough in and of itself. The evidence presented above indicates that in order for efficiency gains to be effective, we will need to scale down aggregate economic activity too. It is more plausible that we will be able to achieve the necessary reductions in resource use and emissions without growth than with growth. Indeed, there are no scientific grounds upon which we should not question growth, if our goal is to avoid dangerous climate change and ecological breakdown. Staying within planetary boundaries may require a de-growth of production and consumption in high-consuming nations (Victor 2008, Alier 2009, Jackson 2009, Kallis 2011, Kallis et al. 2012), and a shift away from the narrow growth focused development agenda in the global South. As Gough (2017) notes, combatting climate change might require not only new clean and efficient energy technologies, but also a reduction and re-composition of consumption, with a shift from carbon-intensive to low or zero carbon sectors. Legislative limits, green taxes, shifts in public investment and working hour-reductions or new social security institutions such as a basic income all have a role to play in such a transition (Gough 2017, Kallis 2018). The objective could be to find ways to decouple prosperity and development from growth (e.g. Jackson, 2009, O’Neill et al. 2018) rather than to continue to chase the phantom of green growth.

It seems likely that the insistence on green growth is politically motivated. The assumption is that it is not politically acceptable to question economic growth and that no nation would voluntarily limit growth in the name of the climate or environment; therefore green growth must be true, since the alternative is disaster. But it might well be the case that, as Wackernagel and Rees (1998) put it, ‘the politically acceptable is ecologically disastrous while the ecologically necessary is politically impossible’. As scientists we should not let political expediency shape our view of facts. We should assess the facts and then draw conclusions, rather than start with palatable conclusions and ignore inconvenient facts.

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Of note is the following paragraph below which refers to the principles of a circular economy and the limited circular potential:

“…UNEP acknowledges that improvements in resource efficiency will not be enough, in and of themselves, to achieve sustainability, or green growth. ‘Resource efficiency alone is not enough. Productivity gains in today’s linear production system are likely to lead to increased material demand through a combination of economic growth and rebound effects’ (12). Instead, the report acknowledges that something else is needed. They suggest further investigation into the principles of a circular economy: ‘a move from linear to circular material flows through a combination of extended product life cycles, intelligent product design and standardization, reuse, recycling and remanufacturing’ (12). Improving circularity could reduce the ecological impact of material throughput, but only a small fraction of total throughput has circular potential. 44 per cent is comprised of food and energy inputs, which are irreversibly degraded, and 27 per cent is net addition to stocks of buildings and infrastructure (Haas et al. 2015).”

**13 September 2020**

**Planetary Accounting**

The publication "*Planetary Accounting: Quantifying How to Live Within Planetary Limits*" by Kate Meyer and Peter Newman is an excellent summary of our impact on the environment. The title of the publication, however, is misleading. The publication does not quantify how to live within planetary limits. Instead, the focus of the publication is on the need to quantify ecological limits.

Meyer & Newman define Planetary Boundaries as “parameters for a healthy planet” and Planetary Quotas as “the prescription for a healthy planet”. According to Meyer & Newman:

“… [Planetary Quotas] will not immediately return the planet to the healthy state described by the PBs [Planetary Boundaries]. However, if followed, we know we are going in the right direction.”

Apart from Planetary Quotas for carbon dioxide and Me-NO, Meyer & Newman do not assign any time frame to Planetary Boundaries and they do not propose any pathway of incremental change. Instead, their research “defines the end goal”. According to Meyer & Newman:

“… It is up to each person, group, business, or sector to define their own transition pathways to operate within the PBs [Planetary Boundaries]. Likewise, the purpose of the PQs [Planetary Quotas] is to allow humanity the freedom and flexibility to determine the best way to operate within the safe operating space.”

The focus of Meyer & Newman’s publication is on quantifying limits and, by doing so, the publication complements Kate Raworth's Doughnut Economics which is essentially a graphical depiction of our quality-of-life indicators versus our impact on the environment indicators shown in the form of a doughnut. Quantification of each indicator is needed before policies of action can be devised to improve our quality of life and to reduce our impact on the environment.

Meyer & Newman’s publication does not address the challenges and difficulties of achieving a pathway which “operates within the safe operating space”. This omission is acknowledged by Meyer & Newman:

“The Planetary Quotas and Planetary Accounting Framework were developed as a way to manage human impacts on the environment in order to return to the safe operating space defined by the Planetary Boundaries. There is much work to be done for this to become a reality.”

Out of curiosity, I carried out a keyword search of Meyer & Newman’s publication: "consumption", "degrowth", "sufficiency", "population", and “economic growth”.

There is no mention of excessive consumption as being a major cause of our impact on Planetary Boundaries and the words "degrowth" and "sufficiency" do not appear anywhere in the publication.

In a reference to population, Meyer & Newman report that:

“Ehrlich and Holdren (1971) proposed a simplified mathematical equation to define the relationship between human impacts on the environment and population, affluence, and technology: I = PAT.”

Meyer and Newman continue as follows:

“[PAT] is perhaps a useful tool in some instances. However, it makes incorrect assumptions about the simplicity of these three variables with respect to their impacts (Alcott 2010). Take, for example, an increase in a city’s population by 100%. Using the IPAT equation we would estimate that the impacts of this city should double if technology does not change. However, the formula ignores the interconnectivity of the variables. An increase in population may lead to changes in both affluence and technology, for example, more efficient public transportation or recycling which generally increase with the size and density of a city, factors which would not have been considered by the IPAT equation.”

There are thermodynamic and physical limits that a so-called “circular economy” can reduce our impact on the environment by adopting more efficient production processes and greater use of recycling. Ultimately, increases in populations in cities can but only lead to greater consumption which, in turn, impacts more on the environment. Meyer & Newman continue:

“To meet the needs of the projected (and current) global population without reducing Earth’s capacity to support the way of life that many of us in the richest nations have now come to expect is not a small undertaking. It may not be possible at all. It is unlikely that it will be possible without fundamentally rethinking the way humans operate—i.e. without systemic change.”

We have already surpassed many Planetary Boundaries and yet Meyer & Newman equivocate about whether it is possible “to meet the needs of the projected (and current) global population without reducing Earth’s capacity to support the way of life that many of us in the richest nations have now come to expect”. It seems to me that Meyer & Newman hold out hopes that improvements in technology alone will compensate for increases in population and affluence.

Meyer & Newman’s only mention of the import on economic growth states:

“Economic growth has been decoupling from greenhouse gas emissions since 2000. For the third year in a row, population and GDP have increased, while global CO2 emissions have remained constant or declined (Newman 2017).”

The publication “Is Green Growth Possible?” by Jason and Hickel and Giorgos Kallis, 2019, and many other publications debunk any possibility of absolute decoupling of economic growth from greenhouse gas emissions. Hickel & Kallis state:

“As the physical limits of resource efficiency are reached, continued GDP growth drives resource use back up. Ward et al conclude that ‘decoupling of GDP growth from resource use, whether relative or absolute, is at best only temporary. Permanent decoupling (absolute or relative) is impossible for essential, non-substitutable resources because the efficiency gains are ultimately governed by physical limits. Growth in GDP ultimately cannot plausibly be decoupled from growth in material and energy use, demonstrating categorically that GDP growth cannot be sustained indefinitely. It is therefore misleading to develop growth-oriented policy around the expectation that decoupling is possible.”

Meyer and Newman conclude:

“Generating change to live within planetary limits is more difficult than simply knowing what these limits are. It is necessary to understand how people behave and what drives people to make certain choices and what structures create dependence on the actions which lead to impacts. … To generate serious change so that we can live within the planet’s environmental limits requires integrative thinking that brings together the scientific knowledge of Earth’s limits, the utility of environmental impact assessment frameworks, and the understanding of behaviour, change, and management theories. This book has begun to show how this can be done.”

I fully agree with Meyer and Newman’s conclusion. The biggest task in front of us lies beyond the disciplines of engineering and science. We need to adopt mutually consistent policies of pathways from fossil fuels to renewable energy and infrastructure at the global, country, city, town, and citizen level and we need to implement these policies now and not later.

Hickel, J. and G. Kallis. (2019) Is Green Growth Possible? *New Political Economy*:1-18.

<https://doi.org/10.1080/13563467.2019.1598964>

Meyer, K. and P. Newman. (2020) *Planetary Accounting: Quantifying How to Live Within Planetary Limits at Different Scales of Human Activity.* Springer Nature Singapore Pte Ltd.

Newman, P. (2017) Decoupling economic growth from fossil fuels. *Mod Econ* (8):791–805.

<https://www.researchgate.net/publication/317383988_Decoupling_Economic_Growth_from_Fossil_Fuels>

**16 September 2020**

**The Overton Window – A model of How Ideas and Policies Change**

I have stated a number of times that action follows belief, and that the environmental movement is in the game of education and persuasion with the objective of changing current government policies and citizen behaviour.

The Overton Window is a model of how ideas and policies change. The Mackinac Center for Public Policy [website](https://www.mackinac.org/OvertonWindow) explains as follows:

“The Overton Window is a model for understanding how ideas in society change over time and influence politics. The core concept is that politicians are limited in what policy ideas they can support — they generally only pursue policies that are widely accepted throughout society as legitimate policy options. These policies lie inside the Overton Window. Other policy ideas exist, but politicians risk losing popular support if they champion these ideas. These policies lie outside the Overton Window.

… the Overton Window can both shift and expand, either increasing or shrinking the number of ideas politicians can support without unduly risking their electoral support. Sometimes politicians can move the Overton Window themselves by courageously endorsing a policy lying outside the window, but this is rare. More often, the window moves based on a much more complex and dynamic phenomenon, one that is not easily controlled from on high: the slow evolution of societal values and norms.

... *All of this suggests that politicians are more followers than they are leaders — it’s the rest of us who ultimately determine the types of policies they’ll get behind. It also implies that our social institutions — families, workplaces, friends, media, churches, voluntary associations, think tanks, schools, charities, and many other phenomena that establish and reinforce societal norms — are more important to shaping our politics than we typically credit them for.”* (My own italics added for emphasis).

I recommend viewing the following YouTube video:

‘*The Overton Window of Political Possibility Explained*’ – Link [here](https://youtu.be/FMU0w4MP8Dc)

And reading the following website publications:

‘*How the Politically Unthinkable Can Become Mainstream* – Link [here](https://www.nytimes.com/2019/02/26/us/politics/overton-window-democrats.html)

*'How Fringe Ideas Become Policy'* – Link [here](https://www.wnycstudios.org/podcasts/otm/segments/how-fringe-ideas-become-policy)

**21 September 2020**

**The Circular Economy – Reply to Fellow SCAN Member**

I agree with what you have written. Yes, we need to have greater circularity in our economies (I still dislike the expression "circular economy") in the same way that nature does, but human society will never have a 100% circularity like nature unless we have a much-reduced global population and live the same life style as hunter gatherers. Greater circularity in the economy is a no brainer. Of course, we need to do this, and we have known this for decades. It has been difficult, however, to achieve this. It is only recently that various groups are now beating their drums for action on this front

Energy and material consumption and economic activity cannot be completely decoupled. The degree of circularity that we are able to have within a technological society is restricted by thermodynamic and physical limits. Greater circularity in the economy will not be enough to sufficiently reduce our greenhouse gas emissions. In addition to greater circularity, we need to even further reduce our current levels of consumption. This applies especially in the developed countries. On top of dramatically reducing our current levels of consumption, we also need to invest heavily in renewable energy and infrastructure. There are many indicators that we would be doing this during a period of the peak production of oil which can only but compound the difficulties of our task in front of us. A transition from fossil fuels to renewable energy and infrastructure will require continued use of fossil fuels because renewable energy is unable to bootstrap itself. Nonetheless, we need to divert energy and materials into renewable energy and infrastructure while still reducing our total consumption of energy and materials.

The book I have recently recommended - [*Climate Change: A Personal Journey Through the Science*](https://www.amazon.com/Climate-Changed-Personal-Journey-through-ebook/dp/B00JMWQV32/ref=tmm_kin_swatch_0?_encoding=UTF8&qid=&sr=) by Philipe Squarzoni, 2015 - is superb in summing up the above issues. This book includes the issue that attainable levels of renewable energy cannot match our current levels of energy provided by fossil fuels. We need to reduce our levels of consumption not only because we need to reduce our levels of greenhouse gas emissions, but also because ultimately we will have to live on a greatly reduced budget of renewable energy in the future. It will be far less painful for society to voluntarily transition to lowers levels of consumption now than to be forced by nature to do so.

I have concerns that many plans of transition from fossil fuels to renewable energy and infrastructure focus on emulating our current fossil fuel modes of transport with a continued reliance on private cars, albeit electric cars. I would much rather see energy and materials diverted to public transport networks than on private transport. The long-term future of steady state settlements is via a process of de-urbanisation. High levels of energy have enabled urbanisation with high density populations living in large cities. This is not possible with lower levels of energy per capita. Localisation and local food production in smaller, but well-connected settlements are our long-term future. Greater local technology production will also be necessary. Any pathway to various forms of steady state settlements must take into account what is not only feasible, but also viable, given what we know now. We need to avoid Pollyanna wishful hopes and plans for the future so as to avoid painful, expensive, and non-reversible dead-end pathways.

The above book addresses the psychology and politics of inaction and the consequences of inaction. I agree with the conclusion of the book that insufficient action to reduce consumption will be taken. Voluntarily reductions in consumption over and above adopting greater levels of circularity in the economy is currently unpopular and is likely to continue to be an unpopular. Human nature being as it is, voluntary reductions in consumption will be strongly resisted.

So, what is the answer? If we do not voluntarily reduce our excessive levels of consumption, then nature will force us to do so. Given the worst-case scenario, I believe New Zealand will fare better than other countries, failing global warfare and subsequent invasion. Regardless of what the future holds in store for us, I believe we should continue the good fight by promoting voluntary change while, at the same time, preparing for the worst.

**29 September 2020**

**Interview of New Zealand Member of Parliament Candidates by Jack Tame on TVNZ One – Link** [**here**](https://www.tvnz.co.nz/one-news/new-zealand/live-stream-young-voters-debate?utm_source=Iterable&utm_medium=email&utm_campaign=morningbriefing)

**My comments to Jack Tame on his Facebook page about New Zealand’s government debt and Modern Monetary Reform**

Hi Jack,

You have done a damn good job interviewing candidates for our coming election. One of the key issues that you have queried candidates on is New Zealand's $170 billion debt resulting from our COVID-19 pandemic. I suspect you are aware of Modern Monetary Reform. History supports the logic that government debt does not need to be repaid to itself when a government has sovereign rights to the issue of fiat money. Government deficit spending is not inflationary when the economy is not running at full capacity and a cash stimulus into the economy is necessary. Government has the ability to create money, but what is not commonly known is that private commercial banks also create money each time a mortgage is taken out. The primary function and income of commercial banks is not that of acting as an intermediary between borrowers and savers.

Modern Monetary Reform is a political hot potato. Nonetheless, it is now more timely than ever that Modern Monetary Reform be addressed and debated on its own merits in the political arena instead of being totally ignored. At minimum, candidates should be asked whether they are aware of Modern Monetary Reform and if so, why they either support or oppose Modern Monetary Reform.

Please confirm or refute my above claims by directing your research team to look at peer reviewed research in international journals on Modern Monetary Reform. An interview of Dr Geoff Bertram [email address supplied] would be a good start.

Kind regards

Ivan M. Johnstone

**1 October 2020**

**Backcasting the Future as Opposed to Forecasting**

The publication *After the Crisis: Two Possible Futures* by Robert Costanza et al. 2020 (download [here](https://www.researchgate.net/publication/344363770_After_the_crisis_two_possible_futures)) describes two models of the future that follow our COVID-19 crisis – the “*Build it Back as Before: Current Economic Model*” and the “*Build it Back Better: Sustainable Wellbeing Economy Model*. The *Build it Back as Before* *Model* is primarily based on a forecasting process which tends to extrapolate the past and present into the future by including many aspects based on assumptions of continued business as usual. One example which comes to mind is the replacement of fossil fuel based vehicles with electric vehicles - the need and desirability of alternative modes of transport in the future are frequently overlooked or dismissed. By way of contrast, the *Build it Back Better* *Model* is primarily based on backcasting.

Although the future is unpredictable, there are nonetheless some aspects of the future we can be assured of with a degree of certainty. These include constraints on fossil fuels and solar based energy, mined minerals, and resources provided by ecosystems. We are able to make reasonable estimates now of what these constraints will be in the future. Any future scenario that we visualise should take these constraints into account. We should not extrapolate future scenarios based on technology that is currently feasible, but not necessarily viable when applied at a global scale without hidden subsidies of fossil fuels. Backcasting is a process which visualises future scenarios we would like to have after taking into account resource constraints. Backcasting then reverse engineers the possible pathways to the future back to the present. By reverse engineering viable future scenarios, necessary policies and actions which are common to all pathways become patently obvious. There are many pathways to the future and not all pathways are desirable. Backcasting, as opposed to forecasting, avoids dead end pathways.

**7 December 2020**

**Modelling the Transition from Fossil Fuels to Renewable Energy**

Over the last two months I have examined simulation models of a transition from fossil fuels to renewable energy. A number of these models have severe limitations. In particular, neoclassical economic models based on GDP parameters are totally devoid of physical reality. It is imperative that any model of a transition from fossil fuels to renewable energy takes into account physical constraints such as the mining of minerals, the peaking of fossil fuels (especially oil), and the EROI of renewable energy sources. The energy and mineral dynamics when investing in renewable energy and infrastructure also need to be taken into account so as to ensure greenhouse gas emissions are reduced during a transition.

The most promising model I have come across so far is [MEDEAS](https://www.medeas.eu), an open-source energy model to guide the transition to a low carbon economy in Europe. The MEDEAS model takes into account biophysical limits, the availability of raw materials, and the impacts of climate change. The model addresses electrification of transport, necessary electricity grid upgrades, the role of natural gas, energy efficiency, energy costs, financing cross-border energy infrastructure, price regulation, raw materials and re-cycling, environmental impacts, social and behavioural adaptations, economic development and climate change adaptation.

The scenarios and pathways modelled in MEDEAS are projections and not forecasts. The scenarios “… do not inform whether the energy transition will really occur or not, they simply depict the possible paths toward the energy transition, each with its own characteristics and its advantages or disadvantages. After identifying what are the possible ways towards the energy transition, the decision of pursuing one of them or a combination of them is our (political, technological, social) decision.” A dynamic common to all scenarios is that the “future scarcity of fossil fuels is the most influential factor in the evolution of the system. Efficiency changes and damage from climate change are also important determinants influencing model results.”

The UNED MOOC platform provides a [free course](https://iedra.uned.es/courses/course-v1:UNED+SMD_X002+2020/about) for those who wish to use the MEDEAS model. Project.

**6 February 2021**

**Developing Sustainable Communities**

A few weeks ago, I came across one of the most comprehensive reports on oil and resources that I have yet seen. The report "Oil from a Critical Raw Material Perspective" by Simon Michaux (2019) provides data and analysis which confirms the conclusion of many peer reviewed publications that business as usual cannot continue and that life over the next number of decades will inevitably undergo a transition in a direction which will be very different from what we have now. Expectations that fossil fuels can be completely replaced by renewable energy sources are simply unrealistic. A consequent transition could initially be one of disruption or even collapse instead of a gradual transition to that of sustainable communities. The 510-page report (39 MB) can be downloaded from [ResearchGate](https://www.researchgate.net/publication/338698253_GTK_Oil_from_a_Critical_Raw_Material_Perspective_FINAL_CC_signatures). Today, I came across a [YouTube presentation](https://youtu.be/CstIiDgbZMo) by Simon Michaux (2013) with the title "Developing a self-sufficient community to meet the challenges of sustainability". The 79-minute-long video provides a comprehensive plan of action to ride through what could well be a disruptive phase of transition to that sustainable communities.

**28 February 2021**

**Lifespan of Infrastructure, Transportation, and Buildings, Money System, and Property Rights**

The lifespan of infrastructure, transportation, and buildings is an issue of sustainability which relates directly to my personal research agenda since 1990 - my PhD "The Mortality of New Zealand Housing Stock" and my subsequent international journal publications. Here are my opening paragraphs in Chapter One of my PhD:

"The statistical concept of mortality which pertains to probabil­ity of loss, survivorship, and life expectation is central to an under­stand­ing of the sustainability of our infrastruc­ture, building stock, equipment and plant. A litera­ture survey of obsolescence in buildings has produced only one empirical study of the mortality of building stock. In the early 1980s, Gleeson carried out a pioneer­ing study of the mortality of a sample of Indianapolis housing stock. Gleeson con­firms there are relatively few researchers working in the same area.

 Government departments, the commercial sector, the building industry, and researchers in New Zealand currently assume patterns of dwelling losses and life expectancy. To date, no empirical study of New Zealand housing stock has been carried out to estab­lish the following gaps in our knowledge: the average economic life of New Zealand housing stock; the minimum replacement rate to ensure the housing stock does not decrease; the dynamics of past dwelling losses and the potential of models to forecast dwelling losses; and housing stock dynamics underlying rehabilitation versus demolition and replace­ment deci­sions.

This thesis undertakes an empirical study of the mortality of New Zealand housing stock in order to bring about a better understanding of housing stock dynamics and the forecasting potential of housing stock models. In doing so, this thesis addresses each of the above areas which relate to mortality."

 I subscribe to the Energy Skeptic [website](http://energyskeptic.com) and Alice Friedemann's summary of the publication "Energy Technology Perspectives 2020" by the International Energy Agency 2020" is one of many sobering summaries on her website. The free IEA publication (12 MB) can be downloaded [here](https://www.iea.org/reports/energy-technology-perspectives-2020).

I keep harping on in my personal blogs about the need for visions of sustainability in the future to be based on physical realities instead of wishful Pollyanna thinking. The above report provides necessary information on physical realities. I also harp on about the need to distinguish and identify between what is feasible and what is viable. For example, attempts to replace our current fleets of fossil fuel-based cars with electric cars will only but squander energy and resources which are better served by directing those resources towards local public transportation and, where possible, towards the electrification of our railway network between cities and towns.

One use of money is seen as being a store of value. I regard money as being an accounting system for claims on current and future resources. These claims can rise with interest and fall with inflation. Imagine if our current money system evaporated overnight (hyperinflation) and we needed a new money system. Local currency systems can bypass any inequitable national money system and support local communities, but current property rights over land and its resources of nature remains problematic. Current resources of land and nature are subject to a human created system of property rights which are restricted to a limited extent by government legislation - no land owner has fully unrestricted use of their land. Both our money system of exchange and property rights over land will largely influence where remaining resources will be directed in the future. I make the point that economic rent enjoyed by land owners should not be allowed to be a barrier to sustainable and equitable pathways from fossil fuels to renewable energy and infrastructure. Property rights over land is a major issue of sustainability and needs to be fully addressed.

**1 March 2021**

**Claims on Current and Future Resources**

A fellow [SCAN](https://www.facebook.com/groups/964056880274284/) member sent me a link to a keynote presentation by William Rees on YouTube titled "[Climate change isn't the problem, so what is](https://youtu.be/9oVTHKzC7TM)".

I hold William Rees in high regard and I have devoted a separate folder on my hard drive for his publications.

This morning I viewed his keynote presentation in full, including question time. His presentation is superb (compulsory viewing by the general public) and I am fully aligned with what he had to say. I found his replies to questions to be especially thought provoking.

My conclusion after five years of updating myself on broader issues of sustainability is that we need to adopt degrowth, an approach which will be high unpopular in the rich counties and strongly resisted. Being realistic, I think that nature, and not deliberate planning at government level will impose a form of degrowth upon us. I therefore believe that communities need to adopt contingency strategies and be prepared for the worst-case eventualities.

If all communities around the world were to adopt a local currency system overnight in place of national money systems, then those who have a store of value in current money (i.e. claims on current and future resources) would lose their claims on resources. Those who are unable to generate income using local currencies would need to be supported by their communities. Collapse of our current financial system would not be a total disaster at the community level if replaced by local currency systems. Life would continue and be more equitable.

When it comes to property rights over land and the resources that land provides - minerals, food production, fossil fuels, etc. - radical changes to property rights will be strongly resisted. I referred to economic rent of property ownership in my previous blog posting. Economic rent is "any payment [in the context of a market transaction] to an owner or factor of production in excess of the costs needed to bring that factor into production".

Before property rights were institutionalised, land and the products from land were free. Apart from humankind, flora and fauna do not make any transaction payments for the use of the resources that land provides. Radical changes to the concept of property rights might be necessary in the future. I have a number of publications at hand on the issue of property rights and sustainability which I have yet to fully absorb and come to any conclusions as to what changes are necessary and how to implement them, if possible. If degrowth should be imposed by nature, then at the community level, changes to property rights would or should be relatively straight forward. It is at the international level which is problematic so long as communities are reliant on minerals and fossil fuels imported from another country. Current property rights to fossil fuel and mineral reserves and their extraction are not going to be relinquished voluntarily. In a worst-case scenario, there will be wars over these resources.

**7 March 2021**

**Claims on Current and Future Resources Continued**

In my previous blog posting dated 1 March 2021, I referred to flora and fauna (apart from humans) not paying each other for the use of the resources that land provides. However, different species do compete for resources provided by land. Flora competes against flora until an ecosystem of flora reaches a stable climax. Fauna has a predator-prey food chain process which results in oscillating but stable fluctuations in population levels. Some tribes kill members of other tribes of the same species in order to claim dominance over territory and food resources. Within some tribes, animals compete against each other to establish the alpha male who has dominance over procreation and some animals kill young members of their own tribes – male lions killing cubs sired by another male - in a competition of genetic dominance. I wonder how many animal species other than humans seek to dominate members within the same tribe in order to monopolise the use of food resources to the extent that other members of the same tribe starve. In the case of humans, extreme domination over resources leads to severe deprivation or even starvation by others. The cause and effect of this dominance is less obvious in our modern world due to the indirect nature of our modern chains of supply and demand. It is difficult to know in good conscience whether the products we consume have resulted from a fair and equitable supply chain.

**7 March 2021**

**Property Rights over Land**

A [SCAN](https://www.facebook.com/groups/964056880274284/) member recommended listening to the [podcast](https://centerforneweconomics.org/events/40th-annual-e-f-schumacher-lectures/) by George Monbiot on land rights in a 40th Annual Schumacher lecture. This was followed up by another SCAN member who recommended reading *The Guardian* [article](https://www.theguardian.com/commentisfree/2020/aug/19/pandemic-right-to-roam-england) about George Monbiot on land rights

George Monbiot is another writer/presenter/researcher who I hold in high regard and I have a separate folder for his publications on my hard drive. He is certainly an influential and prolific writer in *The Guardian*. Out of curiosity, I did a search of my hard drive using [DocFetcher](http://docfetcher.sourceforge.net/en/index.html) to see how many documents refer to his writing - there are currently 236 documents.

George Monbiot is referred to by some as being an extreme left-winger. I don't like putting labels on what I believe in. It is not all black and white. For example, I support some of Act’s policies (far from centre right political party in New Zealand) and I find David Seymour (Leader of Act) to be a welcome breath of fresh air in our New Zealand parliament.

Many would regard my advocacy for curbing population growth (I am in good company here with David Attenborough being the [patron of the Optimum Population Trust](https://www.thetimes.co.uk/article/david-attenborough-to-be-patron-of-optimum-population-trust-2fgmr03xtzg)) and the need for reductions in current consumption (degrowth) as being extreme. I would also be labelled by some as being a socialist. One problem with this label is that many ill-informed people confuse socialism with communism. As a teenager, my reading of "Animal Farm" by George Orwell well and truly turned me off communism.

When I taught Building Economics and Property Economics to BProp students in Auckland from 1994 to 2004, I was up front in our first lecture as to where my political leanings lay. I told the class that there were people in our society who, through no fault of their own, needed a helping hand from the rest of us and that I believed in a humane society. In my opinion, a safety net was necessary to help look after those in need. From my point of view, what distinguished my political leanings from those who leaned to the right from centre was that I was prepared to risk including undeserving people in the safety net to ensure that all those who genuinely needed help indeed got help. It seemed to me that some people leaning to the right were determined to exclude all undeserving people from the safety net, even if that resulted in some people in genuine need being excluded from the safety net. I make no apologies for being concerned for the welfare of my fellow citizens even if that means being labelled as a socialist. I have no truck with those who adopt an every-man-for-himself approach to life.

I also told the BProp class of a story about extreme left wingers and right wingers. An extreme left winger is more concerned about equal outcome for everyone instead of focusing on equal opportunity. I don’t go along with that approach at all. We do not all have the same abilities or motivation to look after our own welfare and that of our families. To me, an extreme right winger is someone who publicly states there should be a level playing field for everyone, but in private works hard to ensure that within the context of playing rugby and scoring goals, that his own goal posts are much higher than that of the opposition. According to Wikipedia, Adam Smith was

“… wary of businessmen and warned of their ‘conspiracy against the public or in some other contrivance to raise prices. Again and again, Smith warned of the collusive nature of business interests, which may form cabals or monopolies, fixing the highest price which can be squeezed out of the buyers. Smith also warned that a business-dominated political system would allow a conspiracy of businesses and industry against consumers, with the former scheming to influence politics and legislation.”

Essentially, when you place an extreme left-winger and right-winger back-to-back, they have their own self-interest in common.

In my 3 March 2019 blog, I wrote:

"… Garret Hardin's 1970s thesis of the inevitability of The Tragedy of the Commons was countered and overturned by Elinor Ostrom, recipient of the Nobel Memorial Prize in Economics. In 1990 Elinor Ostrum published a very readable book on her research called “[Governing the Commons: The Evolution of Institutions for Collective Action](https://www.amazon.com/Governing-Commons-Evolution-Institutions-Collective/dp/1107569788/ref=sr_1_fkmr0_1?keywords=overning+the+Commons%3A+The+Evolution+of+Institutions+for+Collective+Action%2C&qid=1551557098&s=books&sr=1-1-fkmr0)”. In 1978 I followed many others and included Garret Hardin's thesis of inevitability in my sub-thesis “[In Search of Steady State](http://www.insearchofsteadystate.org/downloads/InSearchOfSteadyState-1978.pdf)”. This was a mistake that I now regret. Back then I hadn’t included counter-arguments based on evidence - in hindsight there were none in the 1970s - and drawn my own conclusions."

I now want to follow up on the issue of property of land as being a commons resource. Our money/monetary system and property rights of land are inextricably tied together. It is an issue of power. There is a book I purchased for $6 in a sale in June 1978 titled "[Energy and Structure: A Theory of Social Power](https://www.amazon.com/Energy-Structure-Theory-Social-Power-ebook/dp/B00IJLK63I/ref=sr_1_1?dchild=1&keywords=Energy+and+Structure%3A+A+Theory+of+Social+Power%22+by+Richard+Newbold+Adams&qid=1615052135&s=books&sr=1-1)" by Richard Newbold Adams (1975). In this book there is a quote opposite the title page - "Man's power over Nature turns out to be a power exercised by some men over other men with Nature as its instrument - C.S. Lewis". This book well deserves another read by myself and a first time read by others.

**14 March 2021**

**Property Rights Continued**

Viewing the YouTube video "Tradable Emissions Quotas: A Policy Mechanism to Manage Descent" (link [here](https://youtu.be/ubgmTjQ0KPY)). presented by Josh Floyd prompted me to download the publication "The Political Economy of Deep Decarbonization, Tradable Energy Quotas for Energy Descent Futures" by Samuel Alexander & Josh Floyd (2020) upon which the above video presentation was based (download [here](https://www.mdpi.com/1996-1073/13/17/4304)).

I have been following Samuel Alexander's publications for a number of years now. One of his publications which might be of interest to you is his 2011 PhD thesis "Property Beyond Growth: Toward a Politics of Voluntary Simplicity". (Download [here](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1941069))

There are two advantages of a PhD thesis over peer reviewed international journal publications. PhDs are far more comprehensive because they are not restricted by word count and PhDs are required to provide an up-to-date literature review of the field that they contribute to and extend. This literature review is very useful to anyone who is not already familiar with the field.

Here is Samuel Alexander's abstract of his PhD:

"This jurisprudential thesis argues that when an economy has grown so large that it has reached or exceeded the threshold point beyond which any further growth is ‘uneconomic’ (i.e. socially or ecologically counter-productive), property relations as expressed in law should no longer be defined and defended in order to grow the economy. Instead, property relations should be reconstructed in order to achieve more specific welfare-enhancing objectives – such as eliminating poverty, lessening inequalities, and protecting the environment – and the efficient growth of GDP or lack thereof should be treated as a byproduct of secondary importance. For these reasons reference will be made to a ‘post-growth’ property system, a system whose coherency, viability, and desirability will be evaluated and ultimately defended as the central project of this thesis.

After outlining the central thesis, the introduction looks more closely at the notion of economic growth (as measured by increases in GDP) and considers how its rise to dominance as the pre-eminent policy objective of governments has given modern property law a ‘progrowth’ structure (focusing on the U.S. jurisdiction). Chapter One presents a multidimensional critique of growth – social, ecological, and economic – and concludes by proposing a new macro-economic framework ‘beyond growth.’ Chapter Two examines whether the macro-economic framework proposed could be advanced legally by reconfiguring property relations in advanced capitalist societies. Responding to the objection that such institutional restructuring would illegitimately interfere with established property rights, it is argued: (1) that due to the indeterminacy of property, contract, and market concepts, significant reform of a private property / market system is not a conceptual impossibility; (2) that the state is always and necessarily involved in defining property entitlements and market structures, a point that fundamentally blurs the private / public distinction which is often used to insulate the economy from state intervention; and (3) that defining those property entitlements and market structures is a normative, value-laden undertaking and therefore cannot be done in such a way that is neutral between conceptions of the good life.

Having established that property law, in particular, and the legal framework of the economy, in general, are malleable creatures of legal convention, the argument of the thesis becomes explicitly engaged with questions of normativity and value. Chapter Three draws on the life and ideas of Henry Thoreau to express an anti-consumerist ethics of consumption. It is argued that Thoreau’s ethics of consumption provide a coherent and attractive normative foundation for a post-growth jurisprudence of property. Chapter Four focuses attention on theories of law reform arising out of the growing literature on law and social movements. After explaining how cultural values and practices shape law, this chapter examines the Voluntary Simplicity Movement, an emerging social movement which represents the most coherent manifestation (in contemporary Western culture, at least) of the Thoreauvian ideals of sufficiency and simplicity. It is argued that this social movement will almost certainly need to expand, organize, and politicize, if anything resembling a post-growth property system is to be realized in law. The final chapter goes beyond foundational theory and critique and sketches an outline of what a post-growth property system might actually look like as a legal reality."

There are indeed alternative property rights systems to be explored.

**15 March 2021**

**Recommended Videos**

I have just viewed the 41-minute video: 'We're looking at Billions of People not being able to Survive' | Peter Carter, Expert IPCC Reviewer” (link [here](https://youtu.be/6VSE5ubpKhg)). This video is an abridged version of a 1 hr 27-minute video: "Roger Hallam in discussion with Peter Carter, M.D. | Extinction Rebellion UK" (link [here](https://youtu.be/R3DHJa-IH3I)).

The message of the above videos is that we need to immediately reduce our current consumption levels of goods and services in order to not only avoid runaway climate change over the next number of decades, but also to avoid ecological disaster. The policies of government and business can no longer be based on the goal and expectation of economic growth. Continuing to do so diminishes the chances of survival for both current and future generations. The scientific evidence for this claim is already here for everyone to take on board. In the words of William Gibson “The future is already here – it’s just not very evenly distributed”.

The above message is simple to understand, but is unpopular, and is likely to be strongly resisted. Given the level of inaction by governments over the past 30 years despite warnings about climate change, more talk, more submissions, followed by limited necessary action at government level are likely to continue. Tinkering with climate change policies without the goal of ceasing economic growth is a futile diversion of focus away from the fundamental underlying causes of climate change – excessive consumption combined with continuing population growth.

At the individual level, we have more control over our own actions. The message to local communities should be that we, as individuals, are the cause of climate change due to our current levels of consumption of goods and services. By limiting our consumption, we can all play a part in helping to ameliorate climate change.

As an aside, the natural population birth rate in New Zealand is currently below replacement level. New Zealand's population would decrease if there were zero net immigration. Current increases in the New Zealand population are due to positive net immigration. More people are entering to stay and live in New Zealand than are leaving. Babies born in New Zealand do not immediately result in a greater demand for housing. A net immigration of mature adult immigrants arriving in New Zealand does. Accommodating that increase in population involves building additional housing and infrastructure which requires consumption of fossil fuels, minerals, and natural resources. Population levels in all countries cannot continue to increase indefinitely. Globally, we are currently building additional capital stock to accommodate a population level which cannot be sustained in the future. The same resources should be diverted into a transition from fossil fuels to renewable energy and infrastructure. Sacrifices need to be made and shared between countries and within countries.

**28 March 2021**

**My Submission to the New Zealand Climate Change Commission**

I am a 71-year-old retired academic. My credentials include an A+ major in physics which resulted in a Senior Scholarship in Science, an Honours degree in Architecture, and an empirical PhD which models the dynamics of the New Zealand housing stock from 1857 to 1980. As a Senior Lecturer in the Department of Property, The University of Auckland, I taught building economics, property economics, and property development from 1994 to 2005.

In 2014 I retired with the freedom to update myself on broader issues of sustainability which I had studied almost 40 years earlier in 1978 in a sub-thesis with the title “*In Search of Steady State*”. A summary of my sub-thesis was published in the international journal *Urban Ecology* in 1979 as a [short communication](https://www.researchgate.net/publication/232351092_Ekistics_and_energetics_A_sustainable_future_planning_approach). I am now the host of the website <https://www.insearchofsteadystate.org> which provides resources and links to other resources for in-depth studies on issues of sustainability. This website has an in-built search engine.

Upon starting to collect and read relevant journal publications and books, and view videos, documentaries, and lecture series that address the multi-faceted and interwoven issues of sustainability, I was dismayed to find that the term “sustainability” had been hijacked and bastardised to the extent that many politicians and business leaders still used the term “sustainable growth”. Even government departments which should know better use this phrase. For example, New Zealand’s Ministry of Business Innovation & Employment (MBIE) used this term on its website in October 2016.

“MBIE's purpose is to Grow New Zealand for all. 'Grow' relates to the economy. To achieve the standard of living and quality of life we aspire to, we need a better-performing economy that delivers sustainable growth.”

MBIE was (and possibly still is) in similar company with the [European Commission website](https://ec.europa.eu/info/publications/sustainable-finance-renewed-strategy_en) (updated 5 August 2020) which sets out its Commission action plan on Financing Sustainable Growth.

My submission to the Climate Change Commission is simple. Sustainable economic growth is a physical impossibility on a finite planet and the term is an oxymoron. Combating climate change is a challenge, but so long as the underlying causes of climate change – excessive consumption of stocks of energy, minerals, and natural resources combined with continued population growth – are ignored, then any climate change policy based on the assumption of continued economic growth will be futile. Consumption patterns at government, local body, business, and individual levels need to be reined in. Global population growth remains problematic.

A deliberate government sponsored programme is needed to educate the business sector and the general public that expectations of continued economic growth followed by action based on that misguided belief will slow down and jeopardise declines in greenhouse gas emissions. Government, heads of government departments, and business leaders need to have the courage to spread the message that climate change is a symptom and that the root causes of climate change need to be fully addressed head on. Expectations that green growth is possible needs to be exposed as the subterfuge that it is.

Ivan M. Johnstone BSc (Physics), BArch (Hons), PhD

28 March 2021

**3 April 2021**

**Initial Modified Reply to SCAN Member: The Impact of Climate Change on New Zealanders**

A fellow SCAN member viewed the 41-minute video described in my 15 March 2021 blog posting and emailed me the following questions:

“I am wondering how we can help convey the urgency of the climate/economic situation to a broader public. I looked at all these graphs and I was impressed by the steepness of the lines. But they do not affect emotionally, because the facts conveyed are still removed from what many of us experience right now.

Are there research papers out there that show, like the pandemic models, how climate change will impact directly on me personally and locally and NZ? That combine the graphs by scientists from different fields? Say, growing CO2 levels on my/NZ ability to find food and shelter etc. here where I/we live now, and in five/ten/twenty years’ time?”

My initial modified reply is as follows:

Yes, the general public does need to be educated that the impact of climate change applies to everyone and not just to those unfortunates who live out of sight in another country.

One simple reason why some people dismiss or ignore the urgency of the unfolding impact of climate change is because they do not fully appreciate the dynamics of exponential growth. Al Bartlett, a physicist, spend decades of his life educating the general public as to the true significance of exponential growth. The global population over the last century has undergone rapid exponential growth. A rule of thumb for estimating the time it takes for a population to double in size is to divide 70 by the rate of exponential growth. For example, a population which grows at the exponential rate of 2% doubles in size about every 35 years. Growth in economic activity is measured by GDP. In order for GDP per capita to remain constant, GDP must also grow at the same rate. The rate of growth in GDP has actually been greater than that of the population in many countries. All economic activity requires the use of energy and materials and we are currently still highly dependent on using fossil fuels. Some claim that economic activity can be decoupled from the use of energy. Greater efficiencies can and have resulted in less energy required to generate each dollar of GDP, but there are thermodynamic limitations as to the efficiency of any process. High grade energy is still required for any process and all processes generate waste energy in the form of heat. So long as we continue to be reliant on fossil fuels, there will be greenhouse gas emissions. There is good cause for alarm that continued growth in economic activity will accelerate the rise in accumulated greenhouse gases in the atmosphere with the subsequent risk that tipping points will be triggered resulting in runaway climate change. So long as greenhouse gas emissions are greater than the ability of the ecosphere to absorb without detriment, even small constant levels of greenhouse emissions would eventually lead to runaway climate change.

There are a number of other reasons why some people dismiss, ignore, or deny the impact of climate change. People have different perceptions of when they should take necessary action, even when they know the ultimate conclusion. It is logical that economic growth cannot continue forever on a finite planet and surely even the most die-hard proponents of economic growth would agree to that logic. However, these proponents are reluctant to consider when economic growth should cease. Most retired people know that they will face an inevitable decline and that at some stage they might need to shift from the family home to a smaller home unit or even a rest home in their later years. Nonetheless, a number of retirees stay put until the inevitable is imposed upon them.

People have different perceptions of time and time preference and this changes as they grow older. With young people, now is all important. With maturity, adults can see the need to take actions now to ensure they are able to take better care of their future. Some people are prepared to make greater sacrifices now to take care of the future. The future is more real to them.

There is also the denial that bad things can and do happen - “I am OK now and I expect to be OK tomorrow and for the rest of my life. I don’t see anything bad happening to me”. With regards to climate change, I am constantly drawn to the quotation by William Gibson - “The future is already here — it's just not very evenly distributed". The evidence for what can happen to us is there for us to see and comprehend if we only just took the effort to look around to see what is happening to other people. In the early days of Hitler’s rise to power, a minority of commentators foresaw where Germany was heading. In 1939, Chamberlain chose appeasement with Germany. Churchill saw clearly long before WWII the risks of Hitler’s rise to power. Even when bad things happen in front of us in the here and now, some people are unable to take action and instead react inappropriately. They freeze instead of taking action due to being in shock or denial.

With regards to your question about the impact of climate change to people in New Zealand now and in 5,10, and 20 years’ time, we make forecasts of the future based on personal experience or the experience of others. We get a feeling for the degree of likelihood of some things happening in the future and the risk of undesirable things happening in the future should we not undertake prevention now where possible. There are some future outcomes that are 100% certain. For example, we know with 100% certainty that we cannot survive for more than a few days without water or a few weeks without food. We know with 100% certainty that if globally we allow all our soil to erode, then millions of people will starve. Although some potential outcomes in the future are 100% certain, no one can foretell the unfolding of events leading to a future outcome with 100% certainty.

We already know the impact of climate change in Dunedin, New Zealand. We have had flooding in South Dunedin due to an already high water table compounded by an increase in sea levels and heavy rainfall. This flooding was exacerbated by insufficient clear stormwater drainage and pumping. The risk of future flooding has been researched and documented.

The impact of climate change on New Zealanders in 5, 10, and 20 years’ time has a number of aspects. One impact is climate change itself causing an increase in the severity of weather and increases in sea level rises which can result in drought and fire to vegetation or flooding and landslides. Another impact includes the actions and changes in life style imposed on us by government and local authorities or voluntary actions to help prevent a global runaway of climate change. We are reliant on supply chains provided by other centres in New Zealand and overseas. Any disruption to supply chains has an impact on us in Dunedin. One example of a disruption in our supply chains is the Oil Embargo in the 1970s which resulted in carless days in New Zealand and a four-fold increase in petrol prices. Future increases in petrol prices will have an uneven impact on citizens in Dunedin depending on their disposable income.

I once again come back to the quotation – “The future is already here — it's just not very evenly distributed". As climate change worsens, it is inevitable that the impact of climate change on those less fortunate overseas will spread to other regions. In New Zealand there are some food growing regions which are already prone to drought and flooding. Crops have been wiped out due to heavy hail. More regions in New Zealand will be impacted by climate change as the severity of weather increases.

Whether or not we take personal action now to mitigate the impact of climate change depends on whether we perceive climate change to be a real risk or not despite whether the impact of climate change has so far not impinged on our own life styles. Personal action now also depends on the empathy we have for other people, future generations, and other animals and ecosystems. The evidence that climate change already has a severe impact on other people and ecosystems is well beyond dispute. Globally, we are all in the same boat, and the severity of climate change depends on the collective actions of all countries. Some people are optimistic that sufficient global action will be taken to mitigate the impact of climate change. Others are more dubious. Time will tell whether the optimists or the pessimists turn out to be correct.

**12 April 2021**

**Recommended Documentary - *What the Green Movement Got Wrong***

I recommend viewing the 71-minute documentary *What the Green Movement Got Wrong* on [YouTube](https://youtu.be/P8dl7MklMQQ).

The documentary covers important issues which need to be addressed without bias and provides both sides of the arguments. Unintended consequences, the precautionary principle, and the management of risk underlie each issue. It is not necessarily all black and white.

Apart from the risks of meltdowns and waste disposal of nuclear energy, I am not convinced that nuclear energy is viable without fossil fuel subsidies given the information I have currently have at hand. A comprehensive energy and material flow analysis of nuclear energy is necessary. Even if nuclear energy should be viable in the long term, there is insufficient time now for nuclear energy to replace fossil fuels given the immediate need to reduce greenhouse gas emissions.

Nuclear fusion might be a possible source of energy, but has yet to demonstrate feasibility at any realistic scale, nonetheless viability.

I am totally opposed to geoengineering and I have addressed this issue elsewhere in my personal blog in more detail. Even though global consensus might be reached to ban geoengineering, there still remains the risk of a rogue nation breaking rank.

The benefits of genetically modified food need to be seriously considered and weighed against the risks, noting that some unintended consequences take a number of decades to become apparent.  I am totally opposed to the business model of Monsanto where farmers become reliant on continued purchase of seeds for the next crop. Monsanto’s business model is a deliberate and outrageous crime against humanity and a good example of why the power and influence of corporations need to be reined in.

**29 April 2021**

**The MINE website – Interplay Between Nature and Economy**

I have just come across the [MINE website](http://www.nature-economy.de) which is well worth while having a look at.

The MINE website is similar to the [LEAN LOGIC website](http://www.nature-economy.de/) in that it links different, but related concepts. The MINE website provides a more comprehensive background to each concept. The website is essentially a non-linear electronic book which can be read over the Internet. Each section can also be downloaded as a PDF file.

The website describes itself as follows:

"The MINE website explores the interplay between nature and economy. Focusing on such fundamental concepts as time, thermodynamics, evolution, homo politicus and justice, a new outline of economic activity emerges within nature. The dominant approach of Mainstream Economics, which considers nature as a subsystem of the economy, is thus replaced by a broader and more integrated framework. The visual map and its links between concepts provides an orientation. The visitor can approach the content from their own starting point and follow their own path to discovery. Each concept starts with the historical background and moves on through theory and practice."

**26 May 2021**

**Degrowth and Deurbanisation**

My current focus is on establishing the ultimate patterns of truly sustainable human settlements. By doing so, it is then possible to backcast and plan pathways to a sustainable future based on what is possible and viable rather than forecast and plan pathways to a future based on extrapolations of previous growth. Forecasts based on assumed business-as-usual continued growth underpinned by green-growth wishful thinking are likely to lead to irreversible cul-de-sacs.

Society should have used fossil fuels to transition to renewable energy when only 10% of our endowment of reserves had been consumed, but society ignored Limits to Growth warnings 40 years ago about the possibility of our current predicament. The need to transition from fossil fuels to renewable energy now involves massive investment in new infrastructure which involves the burning of additional fossil fuels (renewables cannot bootstrap itself without the use of fossil fuels) at the very same time that we need to reduce greenhouse gas emission while the rate of supply of conventional oil is peaking and the EROI of fossil fuels are declining. We now have what is called a wicked problem. According to Wikipedia:

"In planning and policy, a wicked problem is a problem that is difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize. It refers to an idea or problem that cannot be fixed, where there is no single solution to the problem; and "wicked" denotes resistance to resolution, rather than evil. Another definition is "a problem whose social complexity means that it has no determinable stopping point". Moreover, because of complex interdependencies, the effort to solve one aspect of a wicked problem may reveal or create other problems."

There is no easy solution to our predicament. What complicates matters as to the pathways we should now adopt during a transition from fossil fuels to renewable energy is the uncertainty as to what level of technology future human settlements will be able to utilise in, say, 200 years’ time. There are strong indications that renewable energy will be unable to provide the same scale of energy per capita that we currently enjoy and that the average EROI utilised by society will be much less. In other words, future generations will have fewer energy slaves to work for them and life styles will be much simpler. Their quality of life will not necessarily be lower than what we currently enjoy.

In 1976, Georgescu-Roegen suggested that the most thermodynamically sound type of social and economic organization was small-scale village production, based upon the solar flows of energy rather than on fossil fuel stocks. He wrote, “...the logical panorama for the future of mankind is a radical de-urbanization with most people practicing organic agriculture on family farms and relying on wood for fuel and many materials, as in the traditional villages”. According to Georgescu-Roegen, a process of sustained deurbanisation led by a rapid transition towards organic agriculture free from fossil fuel inputs could ensure adequate food inputs for the human population. Energy efficiency would be dramatically increased and the wastage of energy through over-heating, over-cooling and speeding would be eliminated. Alongside a growing number of researchers, I have become more persuaded than I was back in 1978 that degrowth is a necessary part of the solution to our current wicked problem. I agree with Georgescu-Roegen that a transition to future sustainable settlements will require a process of deurbanisation. Encouraging a continuation of increased urbanisation is a step in the wrong direction. For example, if New Zealand should continue to expand its total population via net increases in migration (the natural birth rate is currently below replacement level), then additional housing should not increase the densification of housing in urban areas such as Auckland where 33.4% of New Zealand’s population currently reside. Industry, subsequent jobs, and additional housing in smaller cities and especially towns should be encouraged instead.

**11 June 2021**

**Degrowth via The Simpler Way**

The New Zealand [Climate Change Commission](https://www.climatecommission.govt.nz/get-involved/our-advice-and-evidence/) has just delivered its [final advice](https://ccc-production-media.s3.ap-southeast-2.amazonaws.com/public/Inaia-tonu-nei-a-low-emissions-future-for-Aotearoa/Inaia-tonu-nei-a-low-emissions-future-for-Aotearoa.pdf) to Government. Mike Joy, a New Zealand ecologist, has written a scathing critique on the Climate Change Commission report to Government in [Spinoff](https://ccc-production-media.s3.ap-southeast-2.amazonaws.com/public/Inaia-tonu-nei-a-low-emissions-future-for-Aotearoa/Inaia-tonu-nei-a-low-emissions-future-for-Aotearoa.pdf) and was interviewed on [Radio New Zealand](https://www.rnz.co.nz/audio/player?audio_id=2018799160) (RNZ).

It is great that Mike Joy has been able to publicly address many of the issues in Spinoff and RNZ that members of [Seniors Climate Action Network](https://www.facebook.com/pages/category/Not-a-Business/Seniors-for-Climate-Action-Now-117043130147115/) (SCAN) are concerned about. He echoes the need for frugality by consumers and reductions in consumption as a necessary solution to our wicked problem.

We know there are problems and we know what actions we need to undertake at government, local authority, business, local community, family, and individual levels.  If we don't undertake sufficient action over the next two decades to mitigate the impact of climate change, then nature will impose a far more severe and disruptive economic contraction upon us. It is far better to prepare for and plan an orderly pathway of degrowth. The real problem is the narrative of economic growth currently holds sway and there is likely to be strong opposition to any form of degrowth. For this reason, I am pessimistic that sufficient action will be taken.

A Simpler Way is a pathway solution and Ted Trainer who has been advocating this approach for decades has much to offer - read his [Wikipedia profile](https://en.wikipedia.org/wiki/Ted_Trainer). He was born in 1941 and is still publishing peer reviewed papers in international journals at the age of 80.

Ted Trainer has just published a 2021 peer reviewed publication "[*Degrowth: How much is needed?*](https://thesimplerway.info/DegrowthHowMuch.html)". This publication is well worthwhile reading and absorbing. In this publication he refers to an [earlier 2019 publication](https://thesimplerway.info/Eggs.html) "*A Comparison Between the Monetary, Resource and Energy Costs of the Conventional Industrial Supply Path and the “Simpler Way” Path for the Supply of Eggs*". This publication provides support that a Simpler Way approach is practical and viable.

Ted Trainer’s website "[*The Simpler Way*](https://thesimplerway.info)" is even less visually attractive than my own website (I might get around to tarting up my own website sometime in the future, but I currently have other priorities). Nonetheless, his website provides a wealth of information on how to live the Simpler Way. Communities do not need to rely on government action to thrive, though appropriate and timely government action would help to ease a transition from growth to steady state.

**14 June 2021**

**The Urgent Need to Reduce Methane Emissions Belched out by Ruminants**

I recommend viewing the 2021 documentary "*Breaking Boundaries: The Science of Our Planet*" in which “David Attenborough and scientist Johan Rockström examine Earth's biodiversity collapse and how this crisis can still be averted.” This documentary can be viewed on [Netflix](https://www.netflix.com/nz/title/81336476). I also recommend the book "*Breaking Boundaries: The Science of Our Planet*" by Johan Rockström and Owen Gaffney, 2021 available on [Amazon.com](https://www.amazon.com/Breaking-Boundaries-Science-Our-Planet-ebook/dp/B08YN825QM/ref=sr_1_1?keywords=breaking+boundaries&qid=1623561578&s=books&sr=1-1).

Viewing the above documentary has reminded me of and reinforced for me that there is a serious tipping point which might not have any easy resolution. In my 27 January 2020 blog posting, I addressed the dynamics of air pollutants and human induced CO2 emissions. In summary, the combustion of fossil fuels produces emissions of CO2, a long-lived gas, and also short-lived pollutants (sulphur dioxide SO2 etc.) which contribute to the formation of atmospheric aerosols. Short-lived atmospheric aerosols cool the planet and masks the full potential of global warming due to emissions of greenhouse gases. China and other countries are undergoing programmes of reductions in SO2, but global levels of CO2 are currently not decreasing. According to [Shindell and Smith (2019)](https://www.researchgate.net/publication/335900984_Climate_and_air-quality_benefits_of_a_realistic_phase-out_of_fossil_fuels), if aerosols alone are rapidly removed, then the rate of warming could accelerate from current levels of about 0.2 °C per decade to 0.4 to 0.8 °C per decade. Shindell and Smith (2019) conclude that the apparent success of ongoing efforts to reduce air pollution such as China therefore adds to the urgency to phase out the use of fossil fuels. Reductions in CO2 levels need to keep up pace with reductions in SO2 and other pollutants so as to avoid a pulsing effect of a sharp increase in global warming.

Methane is a short-lived greenhouse gas which stays in the atmosphere for 10 years before turning into CO2 which is a long-term greenhouse gas. During this period, methane has the potency of at least 84 times that of CO2. Methane is frequently described as being a CO2 equivalent with 34 times the potency of CO2. This potency is an averaging over 100 years which ignores the dynamics of all forms of greenhouse gases which contribute to climate change in the here and now. Johan Rockström’s findings reinforce the importance of reducing methane gas emissions with urgency to help compensate for reductions in cooling aerosols as we hopefully reduce our burning of fossil fuels. What matters most as to whether there is any triggering of tipping points is the level of greenhouse gases and their full potency over the next decade. Delaying reductions in methane gas emissions could be catastrophic. Reducing herd number of ruminants would significantly reduce methane gas emissions and this can be done within one week. It would be costly to do so, but the risks of triggering tipping points need to be weighed up against those costs. We are going to have to transition to a low greenhouse gas emissions economy whether we do so voluntarily or not. Resisting and delaying an inevitable transition is shooting ourselves in the foot. A transition can be orderly and planned for or it can be highly disruptive. There are alternative pathways that we can adopt instead of attempting to maintain business-as-usual.

**20 June 2021**

**Carbon Footprint Calculators and the Global Warming Potential of Methane**

This morning I made a start on reviewing carbon footprint calculators with the first global carbon footprint calculator listed on my [website](https://www.insearchofsteadystate.org/interactivetools-global.html). I initially started to take some disorganised notes and soon realised that it would be easier to set up a list of criteria to look for after reviewing a number of different calculators.

The [Carbon Footprint Calculator website](https://www.carbonfootprint.com/calculator.aspx) states:

“The GWPs used in the calculation of CO2e are based on the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4) over a 100-year period (this is a requirement for inventory/national reporting purposes).”

I followed up on the above 2007 IPCC document which lists the following CO2 equivalents (CO2e) for methane.

* Methane over 100-year period: CO2e = 25
* Methane over 20-year period: CO2e = 72

I then did an Internet search for updated estimates of the Global Warming Potential (GWP) for methane. The best website I came across for reliable information was the EPA website – [Overview of Greenhouse Gases](https://www.epa.gov/ghgemissions/overview-greenhouse-gases) and [Understanding Global Warming Potentials](https://www.epa.gov/ghgemissions/understanding-global-warming-potentials#Learn%20why). The EPA uses the following updated values based on a 2014 IPCC report:

* Methane lifetime in atmosphere: 12 years
* Methane over 100-year period: CO2e = 28-36
* Methane over 20-year period: CO2e = 84-86

The impact of methane on global warming over a 20-year period is almost 3 time greater than that over a 100-year period. A 20-year time frame is the very time frame that we need to reduce the impact of all forms of greenhouse gases so as to avoid the existential threat of triggering tipping points which would lead to an irreversible cascade of climate change. Why does an international and reputable carbon footprint organisation so blindly diminish the impact of methane emissions, especially when methane belched by ruminants currently forms a substantial proportion of all greenhouse gas emissions? The same question applies to many other organisations, including government departments, which use the GWP impact of methane over a 100-year period instead of the more relevant and critical 20-year period immediately in front of us. Even better would be to use the GWP of methane over a 10-year period when the potency and impact of methane on climate change would be at its greatest.

**21 June 2021**

**Global Warming Potential of Methane and the CCC report of advice to the NZ Government**

This morning I spent a number of hours gathering together all references on methane in the New Zealand Climate Change Commission (CCC) document "*Inaia tonu nei, A low emissions future for Aotearoa*" which advises the New Zealand Government on how to become Carbon Zero by 2050. I will refer to this document as ALEFFA for short. The ALEFFA document is a secured PDF document which does not allow copying paragraphs to another document. PDFs are normally secured only against changes and allow both printing and copying from the screen. I used *ABBYY Screenshot Reader* to copy paragraphs after using the key word "methane" within the *Adobe Acrobat Reader* search engine. This was unnecessarily time consuming.

The above exercise allowed me to very quickly establish that one virtue of the ALEFFA document is that it keeps a separate account of biogenic methane in Megatonnes without having to read the entire 418-page document. However, when methane is combined with other greenhouse gas emissions as a CO2 equivalent, a Greenhouse Warming Potential (GWP) period of 100-years is used. The GWP value for methane over a 100-year period is 28 as compared to a value of 82 over a 20-year period. The reason CCC used GWP values for a 100-year period is explained as follows:

"For our recommended budgets, we have now applied the GWP100 values from the IPCC's Fifth Assessment Report (AR5) so that they will be consistent with the way government will report greenhouse gas emissions for the year 2021 onwards. In the rest of our advice we continue to present emissions using the IPCCs Fourth Assessment Report (AR4) GWP100 values." (Page 10).

CCC has relied on a number of different simulation models to assess the impact of all greenhouse gas emissions on climate change. What is unclear at the moment is whether these simulation models are based on the short-term impact (for example, 20 years) of methane which is almost three times greater than the average impact over 100 years. A number of the models simulate the costs of investment of a transition from fossil fuels to renewable energy and infrastructure against the benefits in dollar terms over time and not in energy terms over time. The embodied energy costs of investment in a transition from fossil fuels to renewable energy and infrastructure would initially cause an increase in greenhouse gas emission unless fossil fuel energy required for investment is diverted from that used for consumption. Whether CCC has made this dynamic clear to the New Zealand Government or not will require reading the ALEFFA document in full.

My previous blog comment that carbon footprint calculators should use a GWP value of 82 for methane over a 20-year period or a higher value over a shorter 10-year period (the lifetime of methane), applies equally to any simulation model. CCC advice to government on carbon emission reductions should also be based on a GWP value at least 82 over a 20-year period for methane otherwise using a GWP value of 28 over a 100-year period for methane grossly diminishes the immediate impact of biogenic methane belched by ruminants on climate change.

**13 August 2021**

**Wicked Problems and “E-Learning About Sustainability” Website**

In my 26 May 2021 blog post I stated that we face what is called a “wicked problem”. According to Wikipedia:

"In planning and policy, a wicked problem is a problem that is difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize. It refers to an idea or problem that cannot be fixed, where there is no single solution to the problem; and "wicked" denotes resistance to resolution, rather than evil. Another definition is "a problem whose social complexity means that it has no determinable stopping point". Moreover, because of complex interdependencies, the effort to solve one aspect of a wicked problem may reveal or create other problems."

The reason I like the concept of the Wicked Problem is because like it or not, a web of problems exists and there is no easy solution. I am not one for sugar coating the difficulties we face and I firmly believe that hard decisions need to be based on a full awareness of the realities we face rather than wishful thinking. Some might see this approach as being overly pessimistic. Consider the following statement – “If we do not voluntarily make necessary changes, then nature will force changes on us”. Is this statement optimistic or pessimistic? It is neither. It is a statement of fact based on the best scientific information that we have. Many people are blissfully unaware of the problems that we truly face and the interconnections between these problems. My aim is to educate these people. Apart from promoting degrowth as one pathway of transition from a growth to a steady state society, I am also aware of the need for contingency planning. Promoting greater community resilience regardless of future outcomes is part of my message.

Nicholas Georgescu-Roegen is my major hero. He was not only acclaimed as being “The Economist’s Economist” by Samuelson, but is also widely acknowledged as being the Father of Steady State Economics. Georgescu-Roegen attempted to inject a much-needed dose of reality into economics. Sadly to say, he was not entirely successful during his own life-time, though there is now a growing groundswell of opposition lead by Steve Keen against the current dominant dysfunctional economics as practiced by William Nordhaus, winner of the so-called “Nobel Prize in Economics” bestowed on him by a commercial bank. Georgescu-Roegen’s most famous book is “The Entropy Law and the Economic Process” published in 1971. My copy is the most highlighted and underlined book in my collection. Georgescu-Roegen’s 1975 publication “Energy and Economic Myths” is a good example of injecting a measure of reality into decision-making. For example, there is still a lot of rubbish written about recycling (pun intended). 100% recycling of humankind created stuff is a physical impossibility. Nature has relied on recycling for billions of years, but Nature requires dispersal of minerals and nutrients whereas humankind requires concentrations of minerals for its technology and the stuff it creates. Concentration of minerals requires energy, hence the limits to recycling. In 1999, the following book was published: “Bioeconomics and Sustainability: Essays in Honour of Nicholas Georgescu-Roegen” edited by Kozo Mayumi and John Gowdy (417 pages). Some essays are summaries and some are extensions of his work. Kozo Mayumi, John Gowdy, and other authors who contributed essays in the above book have continued developing steady state economics. I have made a special effort to collect and absorb their peer reviewed publications.

As a result of studying steady state economics, I have a strong aversion to relying on mental constructs of money stock and flows to establish whether a particular form of renewable energy is viable in the long term or not as opposed to feasible (possible) in the short term. Money is a human construct and one of the functions of money is a claim on current and future resources. These claims can evaporate overnight. It is the physical realties of the exergy of energy and materials which determine whether a particular renewable form of energy is viable or not. I pay attention to energy analysis and dynamic systems analysis studies based on physical parameters and limits and dismiss future projections based merely on GDP projections. Vivid Economics publications based on GDP are good examples of projections devoid of physical realties.

In recent months my focus has been on developing e-learning courses on sustainability. I have now developed a mock-up of a website which will go online when I have completed the first e-learning course. The design of this new website is more attractive for the public than this website which essentially documents my personal updating on broad issues of sustainability since 2015 with no effort to include a more visually attractive layout . The mock-up of the new website can be viewed [here](https://www.insearchofsteadystate.org/e-learningaboutsustainability/E-LearningAboutSustainability.html).

**16 August 2021**

**Copy of Email to** [**SCAN**](https://www.facebook.com/groups/964056880274284)**: Educating the public on issues of sustainability using websites**

A summary before our meeting tomorrow:

1. I have purchased the following domain names:

* issuesofsustainability.org
* e-learningaboutsustainability.org

2. I have completed a mock-up of a website for the e-learningaboutsustainability.org website (link [here](https://www.insearchofsteadystate.org/e-learningaboutsustainability/E-LearningAboutSustainability.html)) and I have compiled a series of graphics for use in this website. I will need to create some new graphics and update some charts with updates from 2015 to 2020. I don't have the original PowerPoint slides of these charts so I will need to create them from scratch. I am now ready to write a script for each slide.

3. I have mentioned that we face a web of issues about sustainability which are all inter-linked. I have also mentioned that David Fleming's book "*LEAN LOGIC: A dictionary for the future and how to survive it*" has been converted into a web publication by Shaun Chamberlin (link [here](https://leanlogic.online)) and that its glossary is cumbersome to use (link [here](https://leanlogic.online/glossary/)). I have created a PDF with links to all entries in the dictionary to help speed up searches (download [here](https://www.insearchofsteadystate.org/downloads/LEAN-LOGIC-by-David-Fleming-Quick-access-to-online-topics.pdf)).

In my opinion, David Fleming's book should have been converted to a web version using HelpNDoc or similar software. An example of this approach can be seen in my work-in-progress web book "*In Search of Steady State Revisited*" (link [here](https://www.insearchofsteadystate.org/workinprogress.html)).

This publication has the following features:

* Contents of chapters and sections within chapters which can be collapsed or expanded.
* Index which links to first use of a term with definition.
* Search Engine which lists all the sections where the word has been used and how many time in each section.
* Links to other websites and sources of information.
* Embedded links to videos hosted by other websites - e.g., YouTube or Vimeo etc.
* Embedded graphics.

HelpNDoc provides all the features of a self-contained Wikipedia. The Personal Edition of HelpNDoc is free with a link to HelpNDoc website in the footer.

4. The purpose of a website on sustainability is to inform the public of the interlinking web of issues of sustainability with summaries of the issues (the bottom line) each backed up by links to peer reviewed publications for credibility. More detailed information with links for additional information can also be included. A visitor to the website should be able to follow a condensed version of the main issues or pursue a more in-depth version.

Yesterday I wrote the following on my To-Do list for this morning: "Make a start on the climate change script" for the e-learningaboutsustainability.org website. Each e-learning course is a daunting task and it would take some time to have the e-learningaboutsustainability.org website up and running online with its first e-learning course.

Overnight, it occurred to me that I already have at hand the makings of a self-contained Wikipedia on issues of sustainability by revamping my work-in-progress publication "*In Search of Steady State Revisited*". I would write a new Preface and include a bottom-line summary at the front of each section that I have already written.

To get maximum exposure to the public as quickly as possible, I am inclined to focus on developing a self-contained Wikipedia website on issues of sustainability even though developing e-learning courses is also worthwhile.

Several contributors to the Wikipedia style website would hasten the development of the website. All contributions must be backed up by primary sources - peer reviewed publications in international high-ranked journals to ensure the website retains credibility. It is so easy to set up a website based journal which does not involved a peer review process. I have such a recent publication at hand. This publication would never have been accepted in its current form by a reputable journal.

I will now create a mock-up of the issuesofsustainability.org website.

**29 August 2021**

***Issues of Sustainability* website now online**

The Issues of Sustainability website can now be viewed [here](https://www.issuesofsustainability.org). The main content of the website consists of a web publication on issues of sustainability as described in my 16 August 2021 Blog post.

**22 November 2021**

**Change in Focus – Now Targeting the General Public**

This website has been targeted at providing resources and links to other resources for in-depth studies on issues of sustainability. My focus from now onwards will be on educating the general public. From time to time, I will continue to add content to this website.

My most recent focus has been on the Seniors Climate Action Network (SCAN) Emissions Reduction Plan submission to the New Zealand Ministry for the Environment. The title of our submission is “Thriving with Planetary Boundaries: Net Zero Emissions by 2030”. The revised submission can be downloaded [here](https://www.issuesofsustainability.org/downloads/SCAN-EmissionsReductionPlanSubmissionDec2021Revision.pdf)

**28 December 2021**

**SCAN Video – “Thriving with Planetary Boundaries: Net Zero Emissions by 2030”**

Seniors Climate Action Network, or SCAN for short, is a group of citizens based in Dunedin, New Zealand who are concerned about the current lack of action to mitigate the impact of climate change. We want to leave behind us a better legacy for our grandchildren than the one which is currently developing.

Our SCAN video is an extended argument for targeting Net Zero Emissions by 2030 instead of by 2050.

The 76 minutes, 1080p video can be viewed or downloaded from [here](https://www.issuesofsustainability.org/downloads/ThrivingWithinPlanetaryBoundaries-SCAN-28December2021-1080p.mp4)

**19 January 2022**

**The priority of Energy Use**

I suggest that one of the motives behind promoting the hydrogen economy is the assumption that business-as-usual can and should continue. If there were no scarcity of minerals and materials for batteries and renewable energy infrastructure, then it might be sensible to use renewables to produce hydrogen if that were the only way to enable continuation of critical branches of our technological supply chains which direct use of renewables could not provide. An analogy is in the days when solar panels were very expensive, it nonetheless made sense to use them in remote areas when the alternative was a far more expensive connection to the power grid.

At some stage in the future, it will take one unit of energy to extract one unit of energy from the ground. At that stage it would be an energy drain to use fossil fuels for energy purposes. Our global web of supply chains is extremely complicated and difficult to unravel. With only one break in a critical link and a domino effect follows. Fossil fuels also have use as a chemical which might form a critical branch of our technological supply chains. In this case it would make sense to use some of our renewable energy to extract fossil fuels from the ground for use as chemicals.

Sensible decision-making comes down to priorities of the use of renewable energy. All governments need to establish what is physically and thermodynamically possible in the future with regards to the production of renewable energy and the supply of minerals and materials. Priorities of the use of energy would change accordingly. Without such studies of what is possible in the future, current decisions or actions related to energy use could prove to be an energy waste and a drain.

When energy is limited, the use of energy needs to be limited on a priority basis. Government has a role in prohibiting or limiting certain uses of energy.  What concerns me is the assumption that we should replace our fleets of fossil fuel-based cars with electric cars. A priority of energy use has yet to be established by any government. So far, all decision-making has been based on incremental attempts to retain business-as-usual, and that includes private transport.

Only the wealthy can afford to purchase electric cars and in New Zealand subsidies are being provided to make that purchase easier. There is currently limited talk or discussions about the need to limit consumption as a way of reducing the use of energy, and that applies especially to the wealthy. It could well prove that a tacit approval to replace fossil-fuel based cars with electric cars would be as much a drain on renewable energy and a dead-end solution to transport as the production of hydrogen.

Current planning at government level is based more on extrapolations of the past rather than on establishing what is possible in the future and backward planning accordingly. No one can foretell what the future will be like, but we can establish a high degree of certainty as to what is impossible. Population growth and economic growth cannot continue forever. This is a key message both government and the public need to take on board.

**6 February 2022**

**The Need for Disaster/Contingency Planning**

Although there is broad agreement that we need to mitigate the impact of climate change by reducing our use of fossil fuels, the scientific community is pulling in different directions on how best to do this. Our approach which includes reducing consumption is the less palatable solution for many compared to a business-as-usual approach of replacing the engines of the Titanic with electric motors. Not only does the general public need to be educated as to physical realities of our total biophysical system, but this also applies to sections of the scientific community. Some members of the scientific community are so blinkered, that they cannot see the woods for the trees they are closely examining.

So, what can one do about it? I don't have any easy answers. One possible approach is re-education, though there is the adage that one can lead a horse to water but cannot make it drink.

If one wants to be better educated on issues of sustainability, then there are stacks of information available, though this does include misinformation, deliberate or not. A self-education process can involve a biased selection of content. Early on in my efforts to update myself on broad issues of sustainability, I became aware that one of the major issues of sustainability that needs to be confronted upfront is critical thinking. Critical thinking is the first issue of sustainability that I have addressed in my Issues of Sustainability web publication. I wish I had the mental energy and motivation to complete this publication. Even then, what good purpose would it serve. The content of a completed publication is already out there and anyone motivated enough to track it down can do so. People need to be already receptive to read and take on board this information. It is the people who are not receptive who are a large part of the problem.

Other approaches include political persuasion. Once again, this involves changing belief systems. Who is going to change their belief system if it is going to disadvantage them personally?

It might be that change will only ever happen when people feel threatened in the here and now rather than in the distant future. There would be an inevitable blame game and competing stories about what has happened and why.

I keep coming back to the approach of hoping for the best, but preparing for the worst. For 50 years the Limits to Growth movement has been fighting a losing battle. We do not have traction and I don't believe we will until things get a lot worse. What will it take? Famine and starvation in some country? Been there, done that (Ethiopia). Thousands of deaths due to heat stroke? Been there, done that (Europe). Massive water shortage in a major city? We are getting close to that.

What is involved in preparing for the worst? I have read so much abstract nonsense on resilience written by academics and a GDP projection approach is not going to be of any use. A practical, cold, and hard reality approach is needed. Lots of questions need to be asked and answered. Contingency planning in New Zealand so far considers only long-term flooding of low-lying areas. That is pathetic. Basic questions need to be asked and answered. In a disaster, how are we going to feed ourselves? How do we keep warm? Who is going to look after those who cannot look after themselves? Disaster planning is needed. Such planning will identify where we are most vulnerable. Addressing that vulnerability will reveal the direction and decisions we need to undertake to ensure long-term survival. Some of these decisions would be to our advantage regardless of whether a disaster occurs or not. One example is our food production system. In the long-term, our current food production system cannot continue without fossil fuels. Another is our transport system. Without fossil fuels, how do we maintain supply chains between cities? Keeping warm? If we still have electricity, what are the priorities of use? What practical skills are needed in a community after a disaster? Are they being taught now? What stores of knowledge are essential to ensure continued survival? What form should that knowledge take? Books or computer hard drives? The list of questions and necessary answers goes on and on. Disaster or contingency planning can reveal necessary priorities of investments and actions in our efforts to mitigate the impact of climate change.

**7 February 2022**

**The Green Growth and Degrowth Movements**

The Laws of Thermodynamics describe and explain the limitations of all processes, including that of life. Life does not violate the Laws of Thermodynamics. Life hastens the increase in Entropy of the Universe. Yes, locally there is an increase in complexity and order, but only because there is a drawdown of available energy which is degraded. Continued life requires the use of materials and energy. In the process. materials are dispersed to the environment and energy is degraded to the low-grade form of heat. Ecological systems require and takes advantage of the dispersal of minerals. Humans who now depend on exosomatic capital in the form of tools and machines require concentrations of materials. It is impossible to fully 100% recycle materials. To do so requires increasing levels of energy.

The sun provides enormous amounts of energy in the form of solar radiation, but humans need to concentrate that energy to form high-grade forms of energy which can do mechanical work. The energy nets that humans use requires the use of minerals and high-grade energy. Minerals are scarce and high concentrations of minerals are continuously dispersed to the environment because 100% recycling is impossible. The energy nets are therefore limited, and likewise the level of high-grade energy that is available to humans despite the enormous flow of solar radiation.

The Laws of Thermodynamics are fundamental, and any viable form of economic system needs to take these laws into account. All processes, including economic activity, requires the use of energy and materials. GDP is a good proxy for the level of both good and bad economic activity, but is not a good indicator of welfare. The primary and ultimate purpose of an economy should be to improve and maintain the welfare of citizens. Because humans are reliant on exosomatic capital, we cannot get away from the fact that our level of technology and wellbeing depends on the use of energy and materials. A service economy cannot escape these requirements. All forms of economy are linear and not circular.  Energy and materials flow into the economy from the environment and low-grade energy in the form of heat and waste flows out into the environment. Waste is inevitable. A truly sustainable economy emits waste at a level that can be safely assimilated by the environment. The level of waste is determined by the level of the population and the level of technology. Some high levels of technology emit poisonous waste which cannot be safely assimilated by the environment.

The above descriptions of the role of energy and materials, thermodynamics, and recycling, do not diminish the role of ecological systems. The above descriptions explain our current needs. Whether we like it or not, modern humans are predators of the environment and its minerals and will continue to be so unless we revert to the level of hunter gatherers. Our current level of population (7.9 billion people) far exceeds the carrying capacity for hunter-gatherers. Reverting to a hunter-gatherer society is not a current option. It would be futile to attempt to do so because billions of people would die in the process. Our planet Earth simply does not have enough ecological space per person to enable a hunter-gatherer society of the size of our current population.

So, what are our options? Continued growth in human populations and consumption which requires the use of energy and materials is not a long-term option, especially when our use of energy includes that of fossil fuels. We now need to mitigate the impact of climate change due to our burning of fossil fuels. Humans have blindly fallen into a fossil fuel trap. An analogy is the monkey trap where a banana is left in the bottom of a container secured to a tree, the top of which is just narrow enough to allow entry of a monkey's hand. If a monkey does not let go of the banana, then it is trapped by its own clenched fist around the banana.

Degrowth is a form of letting go. The emphasis of the degrowth movement is the need to reduce our current levels of consumption. Achieving Zero Population Growth is part of the movement, otherwise any efforts to reduce consumption would be in vain.

Words can have different meanings for different people. The words "growth" and "sustainable" have been bastardised to the extent where even our own Ministry, the MBIE, used the expression "sustainable growth" on its website in October 2016 - "MBIE's purpose to Grow New Zealand for all. 'Grow' related to the economy. To achieve the standard of living and quality of life we aspire to, we need a better-performing economy that delivers sustainable growth'.

When people use the words "growth" and "sustainable". we need to examine the intent and purpose of using those words and what they leave out. My observations of "green growth" are that this is a movement which promotes business-as-usual in another guise of replacing the fossil fuel engines of the Titanic with electric motors. This movement does not promote reductions in consumption and claims that the economy can be decoupled from the use of energy and materials and assumes that 100% recycling is possible. There is loose talk about a service economy which ostensibly uses less energy and materials. This is just a play on words. Activity of any form requires the use of materials and energy regardless of who carries out that activity or service.

Ecological systems are based on the physical realities of energy and materials. Life is dependent on the use of energy and materials. Economic systems should also be based on the physical realities of energy and materials. Current neoliberal economics is too deeply entrenched in models of human constructs and ignores the physical realities of energy and materials. By taking into account the physical realities of energy and materials, we also take into account the needs of biophysical systems. We do not have an either/or situation here. Both biophysical and economic systems make use of energy and materials and are dependent on that use. The steady state economics movement of the 1970s has evolved in a biophysical economics. Both the needs of ecosystems and humans are examined and taken into account.

Solutions to our current predicament are the activities that we undertake or not undertake. For example, do we, as a couple, have a third, a fourth, a fifth child etc. or do we restrict our family to two children? Do we continue our current level of consumption, increase our level of consumption, or decrease our level of consumption? It is our decisions and actions that have an impact on our environment and the environment in turn pushes back on us.

We could create a list of decisions for action that will promote long-term wellbeing of current and future generations of sustainable human settlements within life-supporting sustainable ecological systems. We could use this list of decisions for action to form policies that all humans should abide by. By doing so, we would be setting up a political agenda. The same list of decisions for action could also form the backbone of an economic framework. We could put a label on that economic framework. Would that framework be based on a mere abstract human construct theory or would that framework of economics be based on physical reality? The degrowth movement is based on physical realities and the intent and purpose of the movement is to ensure the sustainability of both the environment and humans. Although it is very tempting, we need to be careful not to be lulled into a false sense of security that business-as-usual can and should continue.

**4 April February 2022**

**Future Focus of this Website**

Over the last 6 weeks I have developed a website for Seniors Climate Action Network (SCAN) – link [here](https://seniorsclimateactionnetwork.org).

My future focus will be on the education of the general public instead of adding more resources for fellow researchers on this website. From now onwards, I will focus on adding more content to my [*Issues of Sustainability*](https://www.issuesofsustainability.org) web publication and providing resources for the general public on our SCAN website.

From time to time I will continue making comments on my personal blog and adding content to my Global and New Zealand News Highlights on this website.