AN OBJECT EXAMPLE OF THE INFEASIBILITY OF "RENEWABLE" ENERGY SOLVING THE ENERGY NEEDS OF NEW SOUTH WALES(NSW)

By: Kevin Loughrey LtCol(Ret'd), BE Mech (hons), psc, jssc

Abstract

In order to provide a reliable pumped hydro system capable of delivery 8GW without interruption, it is estimated that it would require water storage facilities four times the size of Warragamba Dam poised at an average height of 800 metres.

The cost of electricity produced by a roof top solar installation is estimated to be around 10.4 cents/kWh. *This does not take into account the cost of having a storage facility* capable of providing power when the sun isn't shining and the wind isn't blowing.

When the storage facility, necessary for reliable power, 24/7, is taken into account, the cost of electricity produced by the proposed pumped hydro system using roof-top solar systems will be around 21 cents per kiloWatt hour(kWh). This compares poorly to electricity produced by brown coal which is around 2.5 cents/kWh. (See Figure 2.)

In summary, the proposed 8GW pumped hydro system proposed by the NSW Government is unlikely to provide reliable electrical energy to the citizens of NSW and, when it does provide electricity, it will likely cost around 8 times more than electricity that would be produced by, for example, brown coal.

Annex A is a paper that provides proof that Carbon Dioxide does not have an appreciable warming effect on the earth's atmosphere. There is absolutely no justification in science for this extraordinary expenditure to create systems that will not delivery inexpensive, reliable electrical energy but will, instead, ruin the economy of Australia. The only beneficiary of this action, in the long term, will be the Chinese Communist Party.

Dated: 11 June 2024 (see last revision in footer)

Background

This paper does not seek to analyse NSW's present and future energy needs. I may investigate that later. Today, we were told that NSW intends to create a pumped hydro system that will generate 8 Gigawatts on a continuous basis. The inference to be drawn from this, as a consequence of the previous conversation, is that the majority of the power for this pumped hydro system will come from solar panels on the roofs of businesses and domestic dwellings. It may also come from wind farms and mass solar panel installations closely located to the pumped hydro-electric system.

Purpose

The purpose of this paper is to use this example as a means of highlighting the practicality and economy, or otherwise, of such a scheme, ie, a Pumped Hydro electricity system that is capable of delivering 8 Gigawatts on a continuous basis.

Some Basic Physics to Assist the Reader

A watt is a Joule of energy per second. A Joule of energy is expended with a force of 1 kg moves through a distance of 1 metre. When a kilogram mass of water (which is 1 litre) falls through a distance of 1 metre in one second, at 100% efficiency, it is capable of generating 9.80665 watts of power.

Scoping the System

So a system that is creating 8 Gigawatts of power requires that $8/9.80665 \times 10^9$ litres of water flow every second = 0.8158×10^9 litres of water per second through a distance of 1 metre. (Note: This assumes 100% efficiency in the process. I will deal with the matter of system efficiency later in this discussion.) If this system ran for 24 hours it will require $0.8158 \times 10^9 \times 60 \times 60 \times 24$ litres of water = $70{,}485.12 \times 10^9$ litres = 70,485.12 Gigalitres/the elevation of the dam. The average height of the Great Dividing Range is around 600 metres so we will assume that all of the repositories in which the water is stored will be held at that elevation. The water would not run down to 0 metres so let's assume for the sake of this calculation that an average drop of 400 metres would be possible. The number of Gigalitres that would be required to flow through the system to produce 8 Gigawatts for 24 hours is thus, 70,485.12 Gigalitres/400 =176.2128 Gigalitres (if the system was 100% efficient...which it would not be).

Pumped hydro works by pumping the water up to an elevation and then letting it run down hill though pipes (called penstocks) at the bottom of the drop of which are turbines, usually Francis Turbines, connected to electricity generators. The efficiency of a Francis turbine and generators is typically around 90%.

The pumps that move the water up to the elevation usually work at an efficiency around 80%. There is around a 10% loss through friction in the pipes and turbulence, so that overall efficiency of the system is 0.9x0.8x0.9 = 0.64, that is, for every watt of power input, you get 0.64 watts out in the form of electricity.

In addition to this there are losses in voltage transformation and through transmission of the electricity over power lines but these losses are similar to that which one would encounter with a conventional coal-fired base load facility and so, for the purposes of comparing the wind/solar/pumped hydro system with a coal fired generator, we can ignore calculating what these losses are.

This being the case, the amount of water now needed to provide 8 Gigawatts of power for 24 hours continuously is thus 176.2128 /0.64 = 275.3325 Gigalitres. In order to provide reliable power, to cover rainy periods (at the time of writing, in the Northern Rivers area, it has rained for 12 weeks continuously) and periods when the wind does not blow, it is estimated it would be necessary to hold at least 30 days supply of water. This increases the total size of the repositories to 8259.975 Gigalitres. *This is approximately 4.07 times the size of Warragamba Dam's total capacity*[1].

The Cost of Largescale Rooftop Solar

Let's now look at the cost of the roof-top solar systems that will provide the 8 Gigawatts of power on a continuous basis to the system.

For the purposes of this example, we shall assume that all systems are 6 kW capability and cost $8,000 to acquire and install[2].

These systems typically produce 15kWh per day of power during the winter and 30kWh per day of power during the summer.

Unfortunately, bright sunny days are not common except in the driest of areas where there are no houses and therefore no roof-top solar. To set up solar PV systems in the dry, sunlit areas of Australia then requires considerable investment in infrastructure in the form of ultra-high-voltage DC power lines with attendant transformation, inversion and transmission losses. So we will, for the purposes of this paper deal only with urban roof top solar systems. From https://www.currentresults.com/Weather/Australia/Cities/sunshine-annual-average.php we get the following table.

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1 2,027Gigalitre – See https://www.waternsw.com.au/supply/visit/warragamba-dam

2 Note that the Government presently pays around half the cost of a roof top solar system through subsidisation.

Average hours of bright sunshine a year

City	Day	Annual
Adelaide, South Australia	8	2774
Brisbane, Queensland	8	2884
Cairns, Queensland	8	2738
Canberra, Australian Capital Territory	8	2811
Darwin, Northern Territory	9	3103
Hobart, Tasmania	6	2263
Mackay, Queensland	8	2993
Perth, Western Australia	9	3212
Rockhampton, Queensland	7	2592
Sydney, New South Wales	7	2592
Townsville, Queensland	9	3139

Figure 1: Annual "Daylight" hours per location

There are approximately 8,766 hours in an average year of 365.25 days. Of this, 1/2 is nominally "daylight", ie, 4,383 hours. It can be seen from the above table that, because of clouds, one could conservatively reduce the power being typically generated from roof top solar on a cloudless day by around 40%, ie, (15+30)/2*.6 kWh/day = 13.5kWh/day average production.
Given the 8Gigawatt /0.64(the efficiency)= 12.5 GW is needed 24 hours per day, all year round. To produce 24hr x 12.5 GW = 300GWh of power requires $300x10^9/13.5x10^3 = 22.22x10^6$ roof-top solar systems, ie, approx 22 million solar systems. These will cost a total of $\$8,000x22.22x10^6$ = **$177.760 billion**.[3]

For this investment, it would be possible to construct around 88 coal fired power stations, each with a capacity of between 1 & 2 Gigawatts or 44 Nuclear largescale power stations.

The Likely Cost of a kWhr Generated by this Means
These roof-top solar systems have an average life of 25 years. In 25 years, each system will generate 365.25 days in a year x 13.5kWh/day x 25 years = 123,271.875 kWh of electricity. (This does not take into account PV cell degradation which naturally occurs due to ageing.) A system costs approximately 800,000 cents. This comes to 800,000cents / 123,271.875 kWh = approx 6.5 cents/kWh. This does not take into account the bank interest that is lost from this sunk investment. The actual marginal cost is thus (@ 2% interest) in the order of $12,867.50 over a 25 year period which brings the cost of electricity generated by this means to **10.44 cents/kWh**.

This is only the cost per kWhr of electricity generated during the day by PV solar panels. When the sun does not shine and the wind does not blow (in the case of windmills), hydro is necessary and so the cost of a pumped hydro-elect system has to be added to this project.

The Likely Cost of the Pumped Hydro System
The cost of the pumping system, which includes the establishment of significant dams, the pipes, turbines, maintenance, etc is considerable. That cost can be assessed from the experience of the hydro-electricity schemes that do not use pumped hydro. To gain some understanding of this, see:
https://www.irena.org/costs/Power-Generation-Costs/Hydropower

For large hydropower projects the weighted average Levellised Cost of Energy (LCOE) of new projects added over the past decade in China and Brazil was USD 0.040/kWh, around USD 0.084/kWh in North

3 This takes into account that, when the PV systems are operating, they must produce 8GW of power, plus they must provide the power to pump water up to reservoir so that, when the system are not producing power to the full extent or not at all, such as at night, power can still be provided to meet peak demand in the evening and the mornings.

America and USD 0.120/kWh in Europe. For small hydropower projects (1-10 MW) the weighted average LCOE for new projects ranged between USD 0.040/kWh in China, 0.060/kWh in India and Brazil and USD 0.130/kWh in Europe.

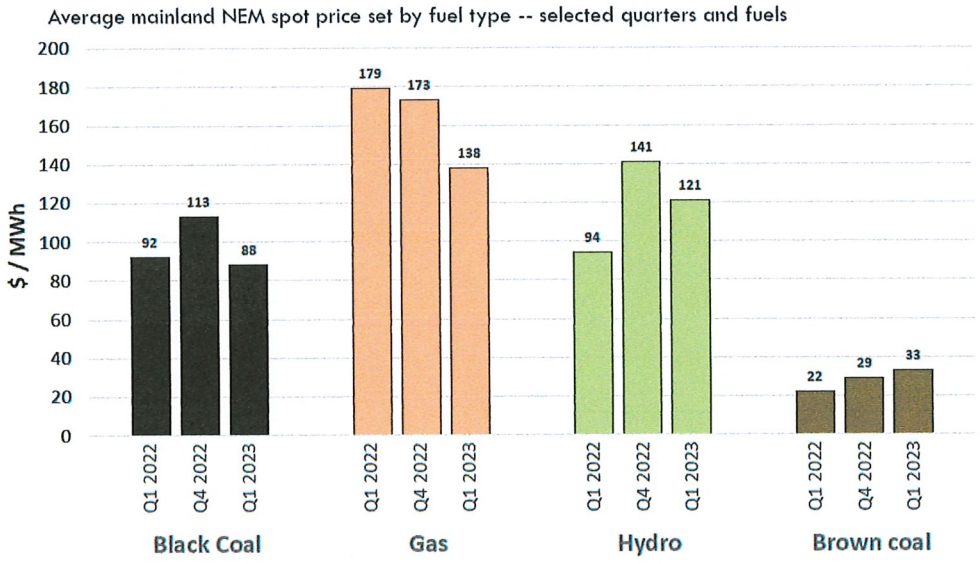
This figure is probably too optimistic in terms of its cost. The cost for the proposed New England project will require massive dams (as touched upon previously in this paper) at both top and bottom plus pumps as well as turbines at the bottom. It has been suggested that the intention is to have massive wind and solar farms fairly close by, thus reducing input transmission losses to the pumps (and the need for long periods of constant hydro), but Armadale is a long way from Sydney and transmission losses could exceed 20%. The total infrastructure and environmental costs would be without precedent in this country.

For this example, we will choose the modest figure of US0.084/kWh (taking the US example which would have similar labour costs.) This comes to 10.6 cents Australian per kWh at present exchange rates.

So the total cost of the proposed pumped hydro solar & wind system, if it is practical at all, is likely to be in excess of **21 cents/kWh** for roof top solar with backup for reliable power supply. Now we should compare this with the cost of power generation using nuclear, coal and gas-fired facilities.

Comparison with Nuclear, Coal and Gas Generation Systems

The following graph produced by Jo Nova uses actual data from the National Electricity Market (Australia) data



Graph by Jo Nova Data: AEMO QED Q1, 2022

Figure 2: Cost per kWh of electricity produced by various means

This graph shows that brown coal is by far the cheapest way to produce electrical power. It should be noted that these cost are based on systems that have been in operation for a long time and so their cost of acquisition has been well and truly amortised.

It is very difficult to obtain factual pricing for (new-build) nuclear, coal and gas however, the order of economy appears to be coal, nuclear and then gas. I have included costs determined by the US Department of Energy as at 2019.

U.S. average levelized costs (2012 $/MWh) for plants entering service in 2019

Table 1: Indicative costs/kWh for various Electricity Generators in the US

Plant type	Capacity factor (%)	Levelized capital cost	Fixed O&M	Variable O&M (including fuel)	Transmission investment	Total system LCOE	Subsidy[1]	Total LCOE including Subsidy
Dispatchable Technologies								
Conventional Coal	85	60	4.2	30.3	1.2	95.6		
Integrated Coal-Gasification Combined Cycle (IGCC)	85	76.1	6.9	31.7	1.2	115.9		
IGCC with CCS	85	97.8	9.8	38.6	1.2	147.4		
Conventional Combined Cycle	87	14.3	1.7	49.1	1.2	66.3		
Advanced Combined Cycle	87	15.7	2	45.5	1.2	64.4		
Advanced CC with CCS	87	30.3	4.2	55.6	1.2	91.3		
Conventional Combustion Turbine	30	40.2	2.8	82	3.4	128.4		
Advanced Combustion Turbine	30	27.3	2.7	70.3	3.4	103.8		
Advanced Nuclear	90	71.4	11.8	11.8	1.1	96.1	-10	86.1
Geothermal	92	34.2	12.2	0	1.4	47.9	-3.4	44.5
Biomass	83	47.4	14.5	39.5	1.2	102.6		
Non-Dispatchable Technologies								
Wind	35	64.1	13	0	3.2	80.3		
Wind-Offshore	37	175.4	22.8	0	5.8	204.1		
Solar PV[2]	25	114.5	11.4	0	4.1	130	-11.5	118.6
Solar Thermal	20	195	42.1	0	6	243.1	-19.5	223.6
Hydro[3]	53	72	4.1	6.4	2	84.5		

According to this, the cost of a kWh of power generated from a newly built coal fired power station is 9.5 US cents. Advanced nuclear is 9.6 US cents. These are for new installations. The US fossil fuel installations face special taxes because of their "carbon" pollution so, without these, the costs would be significantly less and closer to the graph shown above. China retails its electrical power for around US 5 cents/kWh. The costs attributed to nuclear are also controversial and likely to be inflated here.

The US figures therefore are likely to be on the high side compared to what would be experienced in Australia. We shall therefore estimate that **the present day cost of generating electricity using coal or nuclear is around AU 10 cents/kWh**.

It is noteworthy that Australian coal-fired power generation was, before the introduction of intermittent power sources into the network, amongst the cheapest in the world. Here is what has happened to the cost of electrical power after the Labor Government started its drive towards "renewables"

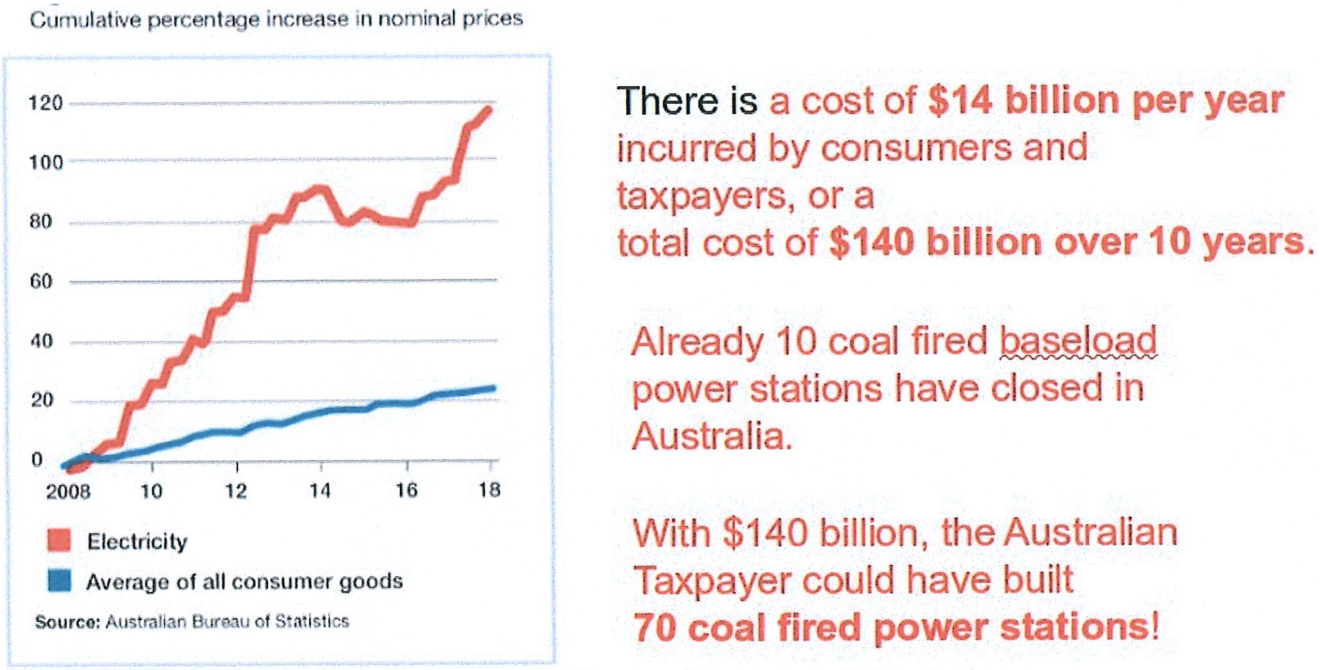
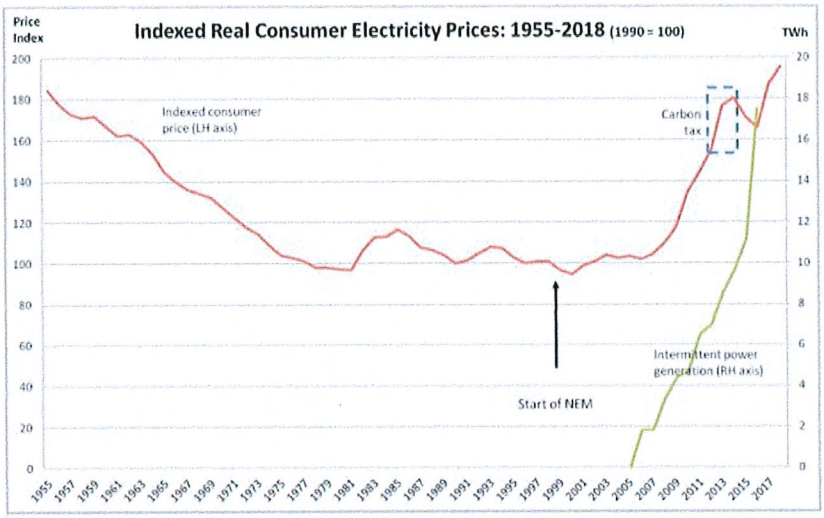


Figure 3: Cost of Electricity in Australia vrs Consumer Price Index

It can be seen that energy in Australia has risen by around 550% higher than the Consumer Price Index over the same period; starting in late 2007 through to 2018. The cost of electricity still rises on the same trajectory. Any suggestion, by advocates of this scheme, that they will achieve a 10% reduction in energy costs has to be viewed against this backdrop. There is a need to reduce energy costs by at least 550% to get back to the situation that existed in 2007-2008. Government could improve on that figure if it adopted coal and nuclear power generation and prevented the unreliable, intermittent inject of power from solar and wind into the network.

The following graph appears to show a correlation between the amount of power being injected intermittently into the grid and the resultant cost of electricity as a consequence.



If Australia is to have the cheapest and most reliable electricity possible, it is imperative that the injectiion of intermittent power into the grid be stopped. If unreliable solar and wind are to be used, they must be backed up by a storage system that ensure input will be reliable and variable according to demand.

Summation

The idea of having pumped hydro driven largely by roof-top solar systems that must be scrapped after 25 years, using components that are largely built in China, appears to carry a high level of risk and will not deliver the cheapest energy to Australian industry and society. This study suggests that:

1. The cost of electricity created by the proposed pumped-hydro, solar and wind scheme will be in the **order of at least AU 21 cents per kWh wholesale**.
2. The cost of producing electricity using coal or nuclear, without the disruption of intermittent injection of power by "renewables", is likely to be significantly less than **AU 10 cents per kWh**.

Experience suggests it is likely that nuclear energy will be slightly cheaper than coal; especially if modular nuclear reactors are collocated at existing coal fired power generation facilities. Nuclear is also an interesting study because if Australia were to develop a nuclear processing and reprocessing industry, it has the potential to earn Australia many billions of dollars per year reprocessing the reactor rods of other countries. This would also aid in preventing nuclear weapons proliferation by tightly controlling the access to fissile material. Any country that did not return its rods for reprocessing would not receive any more enriched uranium.

Given the core justification for pursuing this method of power generation is to reduce emissions, the pumped-hydro project appears to be imprudent and a great waste of taxpayers' money.

- End -

Annex: A. LtCol(Ret'd) K.A. Loughrey, "THE NON-EFFECT OF CARBON DIOXIDE ON WARMING THE EARTH'S ATMOSPHERIC TEMPERATURE", dated 11 June 2024

ANNEX A
TO AN OBJECT EXAMPLE OF THE INFEASIBILITY OF "RENEWABLE" ENERGY SOLVING THE ENERGY NEEDS OF NEW SOUTH WALES(NSW)
DATED 11 June 2024

THE NON-EFFECT OF CARBON DIOXIDE ON WARMING THE EARTH'S ATMOSPHERIC TEMPERATURE

By LtCol Kevin Loughrey(Ret'd), BE Mech(Hons), Grad Dip Strategic Studies(ANU)

The Alleged Cause of Global Warming

It is asserted by some scientists that Carbon Dioxide(CO_2), Nitrous Oxide(N_2O) and Methane(CH_4) are catastrophically warming the atmosphere. Based on this assertion, these scientists, and those politicians and people who are adherents to this belief, demand that mankind dramatically reduce the emissions of these gases. In the agreements reached so far, major emitters of these gases such as Communist China and India are exempt from these restrictions.

But what if the earth's atmosphere is not warming but instead cooling? Would this not put an end to this thesis given that the concentration of CO_2 has been rising steadily for around a century?

Data taken from Ice Cores show no Correlation between CO2 and Atmospheric Temperature

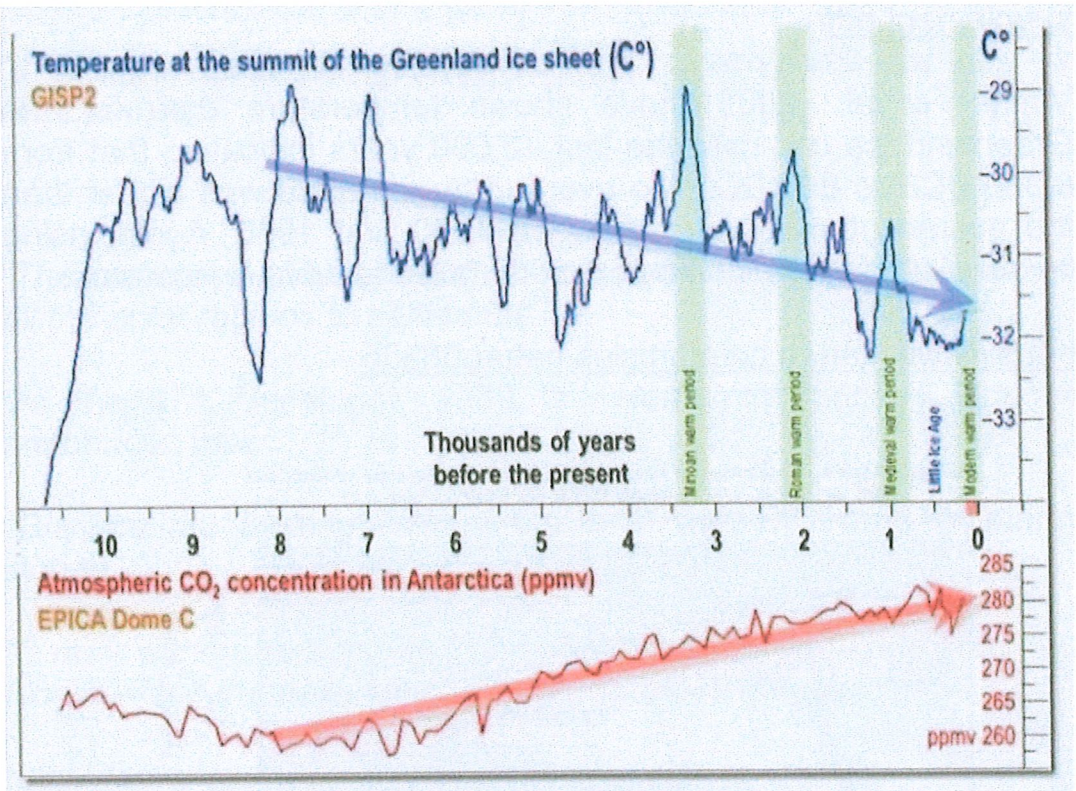


Figure 4: As CO2 Concentration increases, Atmospheric Temperature decreases

Figure 4 displays data, extracted from ice cores in Greenland, pertaining to atmospheric temperature and CO_2 concentration over a period of 10,000 years. The graph shows that, whilst CO_2 has been slowly increasing, the temperature of the atmosphere has been gradually, in fits and starts, decreasing. From

this, it can be seen that CO_2 has no appreciable warming effect on the earth's atmosphere. Given this fact, reducing human emissions of CO_2 is a case of solving a problem that doesn't exist. The above relates to a period of 10,000 years. What about closer to the present day? Let's now look at the temperature data from every major climatology network around the world.

Raw Data from Numerous Climatology Networks all show the same Trend – Downwards!
Here are plots of raw temperature data taken from weather stations of long standing around the world that have not been encroached upon by urbanisation; something that would artificially exaggerate the real situation with respect to the atmospheric temperature close to Earth's surface.

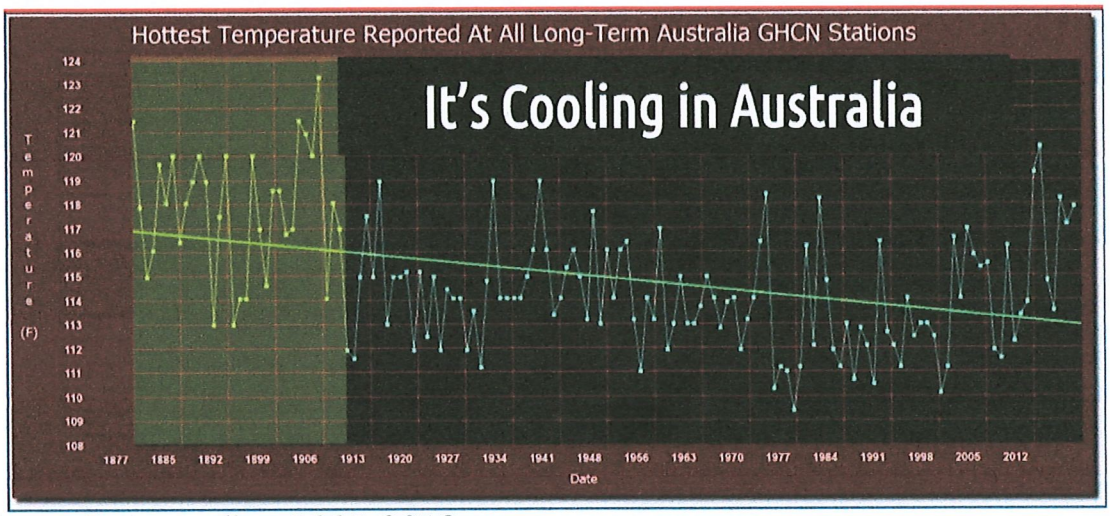


Figure 5: Australia - 1885-2019

According to Figure 5, from 1885 to around 1998, Australia's climate has been cooling. After 1998, the temperature record is broken because the Bureau of Meteorology:

- replaced the analogue measuring systems with digital technology,
- used digital equipment *incapable* of reading temperatures below -10C,
- did not reveal data showing that the results of the two systems when running in parallel produced differing readings and the new system has never been properly calibrated against the analogue system in order to ensure that temperature comparisons would be from the same reference base,
- put the new equipment in smaller housings (called Stevenson Screens) causing them to record a higher temperature, and
- painted the insides of the boxes black[4] so that they radiate onto the measuring equipment – once again causing higher temperatures to be registered.


Figure 6: A Stevenson Screen

Was this incompetence or was it a deliberate ploy to gain Government grants?
So what about the rest of the world? Figures 7 to 12 show the same trend. Temperatures have been on a gradual decline whilst the concentration of CO_2 in the atmosphere has been steadily rising.

4 I was told this by the Hon Craig Kelly MP but haven't been able to verify this. It may not have been a consistent practice or this may have been corrected in some or all of the latest Stevenson Screens.

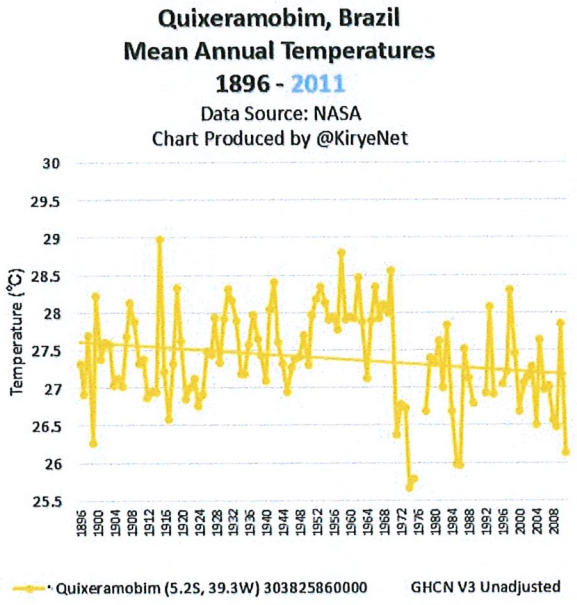


Figure 7: Brazil - 1896 -> 2011

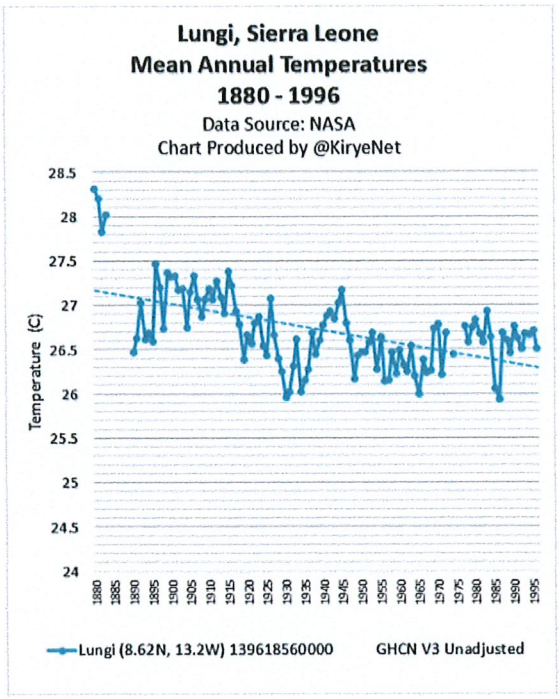


Figure 8: Sierra Leone Africa 1880-1996

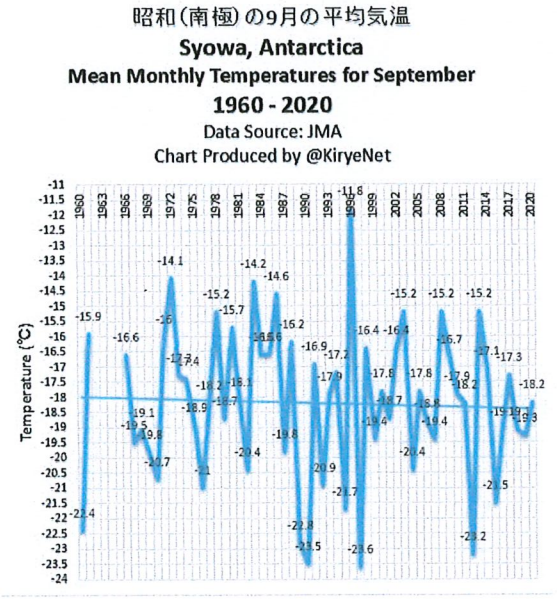


Figure 9: Antarctica 1960->2020

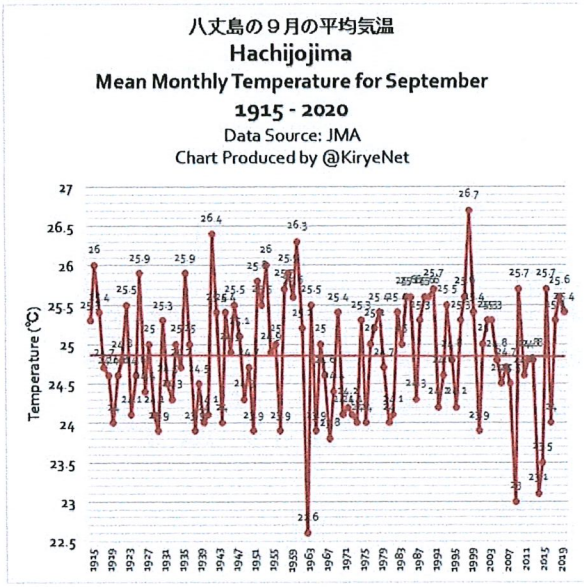


Figure 10: Japan 1915-2020

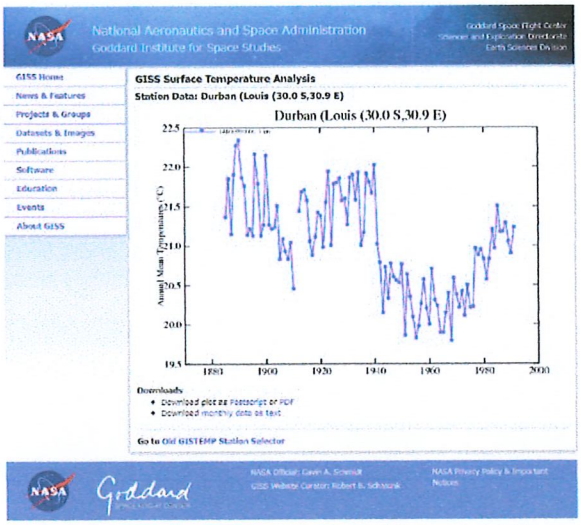


Figure 11: Durban Sth Africa 1885-1995

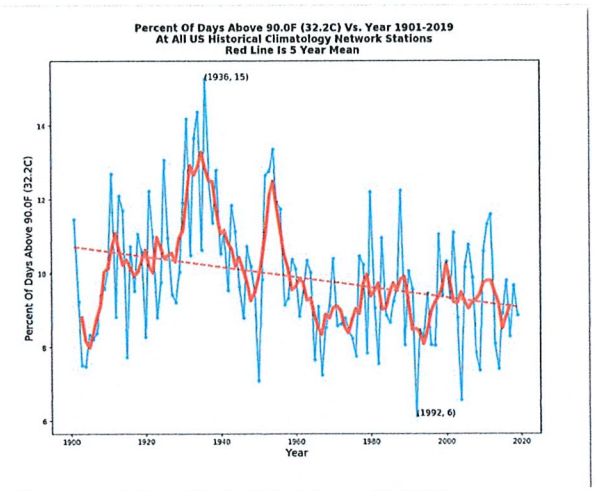


Figure 12: USA 1901-> 2019

The Chances of this being an error are Zero!

Given that these temperature measuring networks recorded their data in isolation of each other because of the lack of global communications in those days, it is an impossibility that they could all be wrong. How is it then, that we are constantly being told that the world will end in a fireball when all historical data show exactly the opposite?!

Carbon Dioxide Concentration during this Period

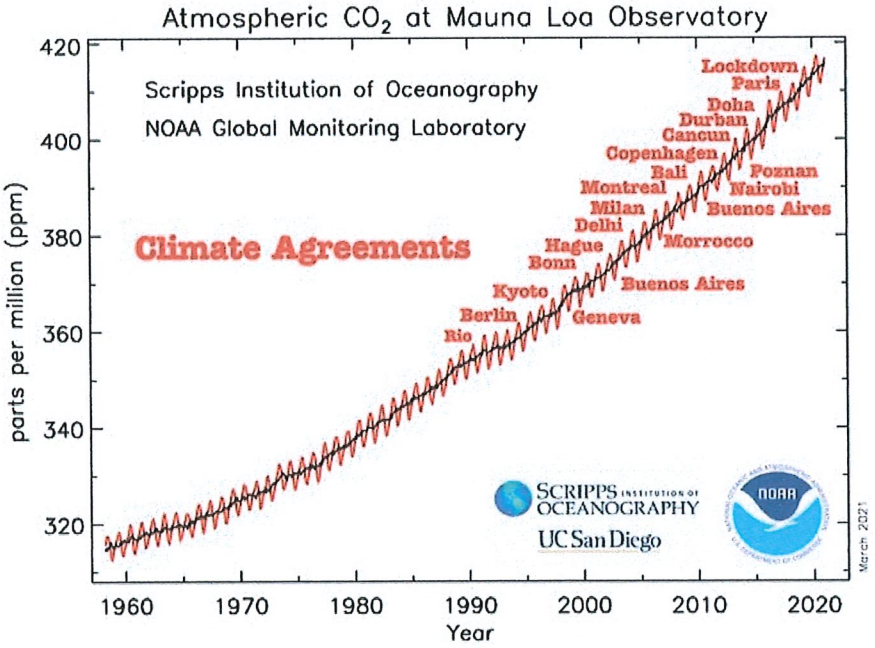


Figure 13: Rising CO2 Concentration for last 60+ years

Figure 13 shows the rise of concentration of CO2 in the earth's atmosphere from approximately 1957 to the 2022. During this time, as shown above, all raw data shows that the temperature of the atmosphere has been dropping or, at the very least, has remained relatively stagnant. Therefore, even with data from a very short time-frame in geological terms, it can be seen that there is no appreciable relationship between the concentration of CO2 in the earth's atmosphere and its average temperature. Certainly, in terms of maximum temperatures there appears to be no difference and even a decline.

A Congregation of the Evil and Wicked

If there is no connection between the concentration of CO_2 in the earth's atmosphere and its temperature, why then are there persons and organisations in this world trying to limit the emissions of CO_2. The reason is quite simple. It is about crippling energy production in Western economies and, by that means, destroying the prosperity of those affected because inexpensive, reliable energy is the foundation stone of any modern prosperous nation.

What you are seeing is very similar to what you saw with the lies promulgated about COVID-19. COVID-19 (alpha) was a disease that was no more dangerous than Influenza if people were given early treatment with a range of low cost medicines. But the use of these treatments was bizarrely banned by Western Governments worldwide! Doctors have been denied the opportunity to properly care for their patients and many have been deregistered for speaking out. Millions of people have died unnecessarily. The wealthy elite have greatly increased their fortunes, just as they are doing with "Climate Change", whilst the middle class and the poor have been further impoverished.

Interestingly, the same people involved in the Climate Change movement were behind COVID-19. These are:

- large financial institutions with massive investments in the Pharmaceutical Industry but also in "renewable" energy technology.
- The World Economic Forum, an organisation aiming to destroy Western economies so as to precipitate a "Great Reset".
- People who just generally hate humanity and believe the world's population should be culled.
- The Chinese Communist Party (CCP), a huge criminal cabal that wants to be the dominant power of the world by 2049, the 100th year of the reign of the CCP of China. The CCP has benefited hugely from "Climate Change". Nearly all renewables hardware is purchased from China and they have not had to reduce their emissions at all so their electricity is 5 times cheaper than most countries comprising the Western economies.

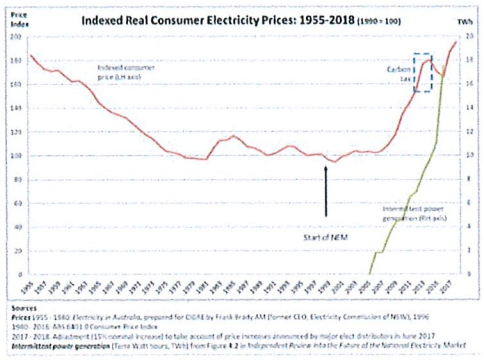


Figure 14: Electricity Cost and effect of Injection of Renewable Power

Figure 14 shows that there is a direct correlation between the cost of electricity in Australia and the injection of intermittent power from appliances like roof top solar and windmills.

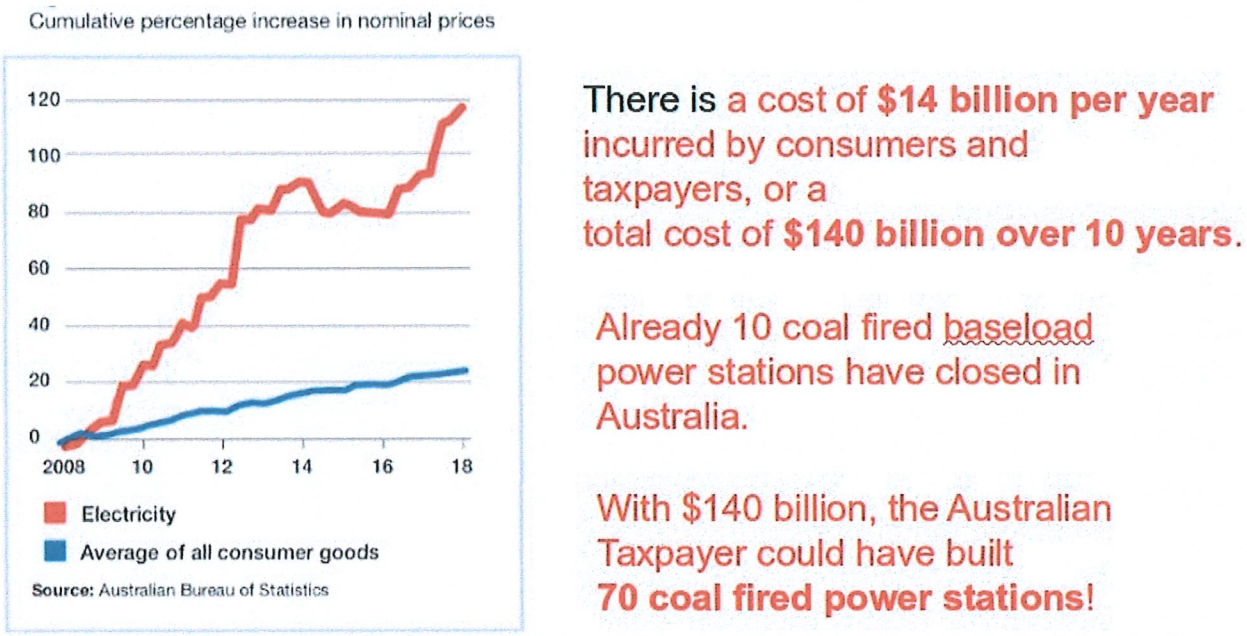
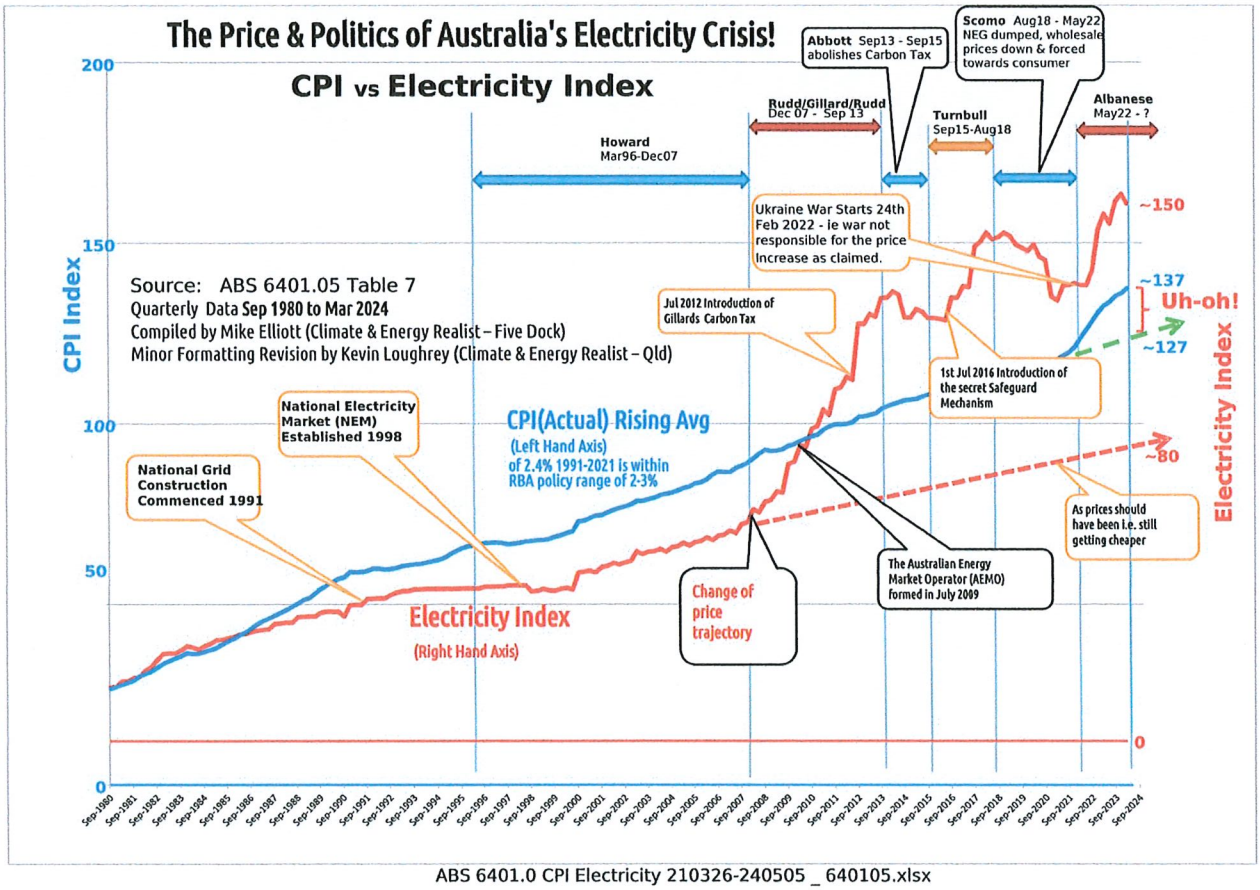


Figure 15: The rising cost of electricity compared to the Consumer Price Index

As per Figure 15, the cost of electricity has risen by more than 6 times the Consumer Price Index whilst, all the time, the Australian public has been assured that renewable energy would be cheaper. Clearly it is not!



ABS 6401.0 CPI Electricity 210326-240505 _ 640105.xlsx

Figure 16: Comparison of the Cost of Electricity against Consumer Price Index with annotations

Figure 16 provides more detail regarding the rapidly increasing cost of electricity as a consequence of the introduction of intermittent power systems in the form of wind and solar generators.

Cheap reliable energy is the foundation stone of any modern society. With energy costs many times greater than that of Communist China, Australia is well on the way to being both impoverished and vulnerable to take-over by foreign interests.

The Path to Salvation

It would be comparatively simple to rectify what has happened:

1. Carry out a massive public relations campaign to prove to the public that they have been misled. CO_2 does not appreciably warm the earth's atmosphere and, in fact, the extra concentration of this gas is doing enormous good. This education of the public is critically important because without that, there will not be the political will to carry out other reforms that will be necessary if Western economies will once again have inexpensive, reliable energy to drive their industries and their economies.
2. Abolish all subsidies related to energy generation of any sort.
3. Abolish any regulations that mandate in any way the use of "renewables" and "renewable" energy.
4. Revert to the way that electricity was generated before 2007. It is madness to inject power intermittently into a power grid.
5. Explore the feasibility of placing modular nuclear reactors, based on the latest proven technology, at some existing power stations where that is cost effective. (If this were commercially viable, the cost and time needed to transition to nuclear technology would be far, far less than building new base-load power generating facilities, based upon nuclear technology, from scratch.)

If we fail to do this, the future for our children, grandchildren and their successors looks extremely bleak.

-End of Paper -

With Compliments

Please find enclosed a letter and its enclosures addressed to all Commissioners within the Independent Planning Commission.

Given the criticality of the issue covered in this correspondence to the future prosperity and well-being of the people of NSW and, indeed, the citizens of Australia generally, I would be most grateful if you would distribute this communication to all accordingly.

Sincerely

Kevin Loughrey

LtCol Kevin Loughrey (Ret'd)
[redacted]
11 June 2024

The Independent Planning Commission of New South Wales
Suite 15.02,
135 King Street
SYDNEY NSW 2000

7 June 2024

For the attention of:

Commissioner Janett Milligan - (Panel Chair)
Commissioner Duncan Marshall AM , and
Commissioner Suellen Fitzgerald.

For information:

See distribution list.

Request that you thoroughly investigate and verify the justification for Net Zero and the Replacement of Coal-fired, Base-load Power Stations with Wind and Solar Electricity Generation Systems

Dear Commissioners

My sincere thanks for your giving me the opportunity to present to you, on Wednesday, 5th June 2024, at Dunedoo, my submission opposing the Birrawa Solar Project and all other similar Projects involving Wind and Solar Electricity Generation Systems.

In that submission I informed you that "Net Zero" is based on 3 false premises, these being:

1. Carbon Dioxide, Methane and Nitrous Oxide appreciably warm the earth's atmosphere.
2. The earth's atmosphere is warming because of human emissions of these gases, especially Carbon Dioxide.
3. Windmills and Solar Panels will reduce mankind's emissions of Carbon Dioxide whilst generating electricity that is cheaper than that which is presently created by coal-fired, base-load power generation facilities.

I have provided you with documentary evidence supporting my assertion that the premises upon which these schemes are based are false, in the form of various papers & graphs as well as referring you to a recently produced movie which can be found at https://climatethemovie.net/ If you have not watched that documentary, I urge you to do so as it further substantiates my claims. Although not mentioned before, should you still be doubtful, there are two absolutely excellent books on this subject by Dr John Happs that will fully inform you of all its pertinent aspects; these being:

1. "Climate change : a politicised storm in a teacup" by Dr John Happs (See https://catalogue.nla.gov.au/catalog/8541259), and
2. "Climate change 2 : how politics and self-interests have debased science" by Dr John Happs (https://catalogue.nla.gov.au/catalog/8650573).

I would be grateful if you would thoroughly review the evidence I have presented and, should you find any of it lacking, please advise me of where you believe it is deficient.

If, on the other hand, you find the evidence I have presented to you to be valid, I believe you are obliged to discharge your duty, as the Independent Planning Commission of New South Wales, and rule this project and, for that matter, all other projects that seek to replace base-load, coal-fired power stations with wind and solar generation plants, cannot in any way be justified and must be halted.

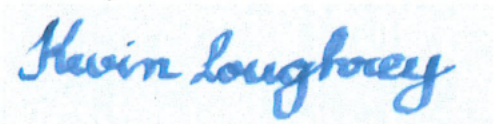
It is particularly noteworthy that none of these projects have committed to providing reliable, that is .9999 confidence level, electricity to satisfy demand ***at a specified cost.*** Given the public has been given numerous assurances, by Government and the promoters of these schemes, costing many billions of dollars, that wind and solar generation systems will produce electricity cheaper than coal-fired, base-load power stations, this failure to provide a performance guarantee, by any commercial standard, is totally unacceptable and, if your organisation is to be faithful to its charter and have relevance, you should find it so.

I look forward to your response to this letter confirming that the evidence I have provided to you is valid and confirming that you will halt the Birrawa Solar Project and all other similar projects in NSW as a consequence.

If you need to speak to experts in this area I have the necessary contacts to arrange that for you.

In closing, I reiterate, the point I made at the end of my submission in Dunedoo. We all have children and grandchildren. We all have a vested interest in ensuring they and their successors live prosperous and happy lives. These intermittent power systems, built on borrowed money, profiting Communist China, will not only bankrupt our already heavily indebted country but they will destroy the efficient, cheap production of electricity so necessary for our quality of life, the competitiveness of our industries and Australia's national security.

Sincerely



K.A.LOUGHREY LtCol(Ret'd) BE Mech(hons), psc, jssc, Grad Dip Strategic Studies
[redacted]

For information:
Commissioner Andrew Mills-Chair
Commissioner Terry Bailey
Commissioner Professor Snow Barlow
Commissioner Michael Chilcott
Commissioner Professor Alice Clark
Commissioner Sheridan Coakes
Commissioner Bronwyn Evans
Commissioner Juliet Grant
Commissioner Ken Kanofski
Commissioner Wendy Lewin
Commissioner Alison McCabe

Commissioner Neal Menzies
Commissioner Richard Pearson
Commissioner Adrian Pilton
Commissioner Clare Sykes
Commissioner Elizabeth Taylor
Commissioner Chris Wilson
Commissioner Michael Wright

Enclosures:

1. Paper by Professor Dr John Clauser, "II. A Cloud Thermostat Controls the Earth's Climate, Not Greenhouse gasses! andI. Climate change is a myth!" dated 8 May 2024.
2. Paper by LtCol Kevin Loughrey(Ret'd), BE Mech(hons), "An Object Example of the Infeasibility of 'Renewable' Energy Solving the Energy Needs of New South Wales(NSW)" dated 11 June 2024

AN OBJECT EXAMPLE OF THE INFEASIBILITY OF "RENEWABLE" ENERGY SOLVING THE ENERGY NEEDS OF NEW SOUTH WALES(NSW)

By: Kevin Loughrey LtCol(Ret'd), BE Mech (hons), psc, jssc

Abstract

In order to provide a reliable pumped hydro system capable of delivery 8GW without interruption, it is estimated that it would require water storage facilities four times the size of Warragamba Dam poised at an average height of 800 metres.

The cost of electricity produced by a roof top solar installation is estimated to be around 10.4 cents/kWh. *This does not take into account the cost of having a storage facility* capable of providing power when the sun isn't shining and the wind isn't blowing.

When the storage facility, necessary for reliable power, 24/7, is taken into account, the cost of electricity produced by the proposed pumped hydro system using roof-top solar systems will be around 21 cents per kiloWatt hour(kWh). This compares poorly to electricity produced by brown coal which is around 2.5 cents/kWh. (See Figure 2.)

In summary, the proposed 8GW pumped hydro system proposed by the NSW Government is unlikely to provide reliable electrical energy to the citizens of NSW and, when it does provide electricity, it will likely cost around 8 times more than electricity that would be produced by, for example, brown coal.

Annex A is a paper that provides proof that Carbon Dioxide does not have an appreciable warming effect on the earth's atmosphere. There is absolutely no justification in science for this extraordinary expenditure to create systems that will not delivery inexpensive, reliable electrical energy but will, instead, ruin the economy of Australia. The only beneficiary of this action, in the long term, will be the Chinese Communist Party.

Dated: 11 June 2024 (see last revision in footer)

Background

This paper does not seek to analyse NSW's present and future energy needs. I may investigate that later. Today, we were told that NSW intends to create a pumped hydro system that will generate 8 Gigawatts on a continuous basis. The inference to be drawn from this, as a consequence of the previous conversation, is that the majority of the power for this pumped hydro system will come from solar panels on the roofs of businesses and domestic dwellings. It may also come from wind farms and mass solar panel installations closely located to the pumped hydro-electric system.

Purpose

The purpose of this paper is to use this example as a means of highlighting the practicality and economy, or otherwise, of such a scheme, ie, a Pumped Hydro electricity system that is capable of delivering 8 Gigawatts on a continuous basis.

Some Basic Physics to Assist the Reader

A watt is a Joule of energy per second. A Joule of energy is expended with a force of 1 kg moves through a distance of 1 metre. When a kilogram mass of water (which is 1 litre) falls through a distance of 1 metre in one second, at 100% efficiency, it is capable of generating 9.80665 watts of power.

Scoping the System

So a system that is creating 8 Gigawatts of power requires that $8/9.80665 \times 10^9$ litres of water flow every second = 0.8158×10^9 litres of water per second through a distance of 1 metre. (Note: This assumes 100% efficiency in the process. I will deal with the matter of system efficiency later in this discussion.) If this system ran for 24 hours it will require $0.8158 \times 10^9 \times 60 \times 60 \times 24$ litres of water = $70{,}485.12 \times 10^9$ litres = 70,485.12 Gigalitres/the elevation of the dam. The average height of the Great Dividing Range is around 600 metres so we will assume that all of the repositories in which the water is stored will be held at that elevation. The water would not run down to 0 metres so let's assume for the sake of this calculation that an average drop of 400 metres would be possible. The number of Gigalitres that would be required to flow through the system to produce 8 Gigawatts for 24 hours is thus, 70,485.12 Gigalitres/400 =176.2128 Gigalitres (if the system was 100% efficient...which it would not be).

Pumped hydro works by pumping the water up to an elevation and then letting it run down hill though pipes (called penstocks) at the bottom of the drop of which are turbines, usually Francis Turbines, connected to electricity generators. The efficiency of a Francis turbine and generators is typically around 90%.

The pumps that move the water up to the elevation usually work at an efficiency around 80%. There is around a 10% loss through friction in the pipes and turbulence, so that overall efficiency of the system is 0.9x0.8x0.9 = 0.64, that is, for every watt of power input, you get 0.64 watts out in the form of electricity.

In addition to this there are losses in voltage transformation and through transmission of the electricity over power lines but these losses are similar to that which one would encounter with a conventional coal-fired base load facility and so, for the purposes of comparing the wind/solar/pumped hydro system with a coal fired generator, we can ignore calculating what these losses are.

This being the case, the amount of water now needed to provide 8 Gigawatts of power for 24 hours continuously is thus 176.2128 /0.64 = 275.3325 Gigalitres. In order to provide reliable power, to cover rainy periods (at the time of writing, in the Northern Rivers area, it has rained for 12 weeks continuously) and periods when the wind does not blow, it is estimated it would be necessary to hold at least 30 days supply of water. This increases the total size of the repositories to 8259.975 Gigalitres. *This is approximately 4.07 times the size of Warragamba Dam's total capacity*[1].

The Cost of Largescale Rooftop Solar

Let's now look at the cost of the roof-top solar systems that will provide the 8 Gigawatts of power on a continuous basis to the system.

For the purposes of this example, we shall assume that all systems are 6 kW capability and cost $8,000 to acquire and install[2].

These systems typically produce 15kWh per day of power during the winter and 30kWh per day of power during the summer.

Unfortunately, bright sunny days are not common except in the driest of areas where there are no houses and therefore no roof-top solar. To set up solar PV systems in the dry, sunlit areas of Australia then requires considerable investment in infrastructure in the form of ultra-high-voltage DC power lines with attendant transformation, inversion and transmission losses. So we will, for the purposes of this paper deal only with urban roof top solar systems. From https://www.currentresults.com/Weather/Australia/Cities/sunshine-annual-average.php we get the following table.

---

1 2,027Gigalitre – See https://www.waternsw.com.au/supply/visit/warragamba-dam

2 Note that the Government presently pays around half the cost of a roof top solar system through subsidisation.

Average hours of bright sunshine a year

City	Day	Annual
Adelaide, South Australia	8	2774
Brisbane, Queensland	8	2884
Cairns, Queensland	8	2738
Canberra, Australian Capital Territory	8	2811
Darwin, Northern Territory	9	3103
Hobart, Tasmania	6	2263
Mackay, Queensland	8	2993
Perth, Western Australia	9	3212
Rockhampton, Queensland	7	2592
Sydney, New South Wales	7	2592
Townsville, Queensland	9	3139

Figure 1: Annual "Daylight" hours per location

There are approximately 8,766 hours in an average year of 365.25 days. Of this, 1/2 is nominally "daylight", ie, 4,383 hours. It can be seen from the above table that, because of clouds, one could conservatively reduce the power being typically generated from roof top solar on a cloudless day by around 40%, ie, (15+30)/2*.6 kWh/day = 13.5kWh/day average production.
Given the 8Gigawatt /0.64(the efficiency)= 12.5 GW is needed 24 hours per day, all year round. To produce 24hr x 12.5 GW = 300GWh of power requires $300x10^9/13.5x10^3 = 22.22x10^6$ roof-top solar systems, ie, approx 22 million solar systems. These will cost a total of $\$8,000x22.22x10^6$ = **$177.760 billion**.[3]

For this investment, it would be possible to construct around 88 coal fired power stations, each with a capacity of between 1 & 2 Gigawatts or 44 Nuclear largescale power stations.

The Likely Cost of a kWhr Generated by this Means
These roof-top solar systems have an average life of 25 years. In 25 years, each system will generate 365.25 days in a year x 13.5kWh/day x 25 years = 123,271.875 kWh of electricity. (This does not take into account PV cell degradation which naturally occurs due to ageing.) A system costs approximately 800,000 cents. This comes to 800,000cents / 123,271.875 kWh = approx 6.5 cents/kWh. This does not take into account the bank interest that is lost from this sunk investment. The actual marginal cost is thus (@ 2% interest) in the order of $12,867.50 over a 25 year period which brings the cost of electricity generated by this means to **10.44 cents/kWh**.

This is only the cost per kWhr of electricity generated during the day by PV solar panels. When the sun does not shine and the wind does not blow (in the case of windmills), hydro is necessary and so the cost of a pumped hydro-elect system has to be added to this project.

The Likely Cost of the Pumped Hydro System
The cost of the pumping system, which includes the establishment of significant dams, the pipes, turbines, maintenance, etc is considerable. That cost can be assessed from the experience of the hydro-electricity schemes that do not use pumped hydro. To gain some understanding of this, see:
https://www.irena.org/costs/Power-Generation-Costs/Hydropower

For large hydropower projects the weighted average Levellised Cost of Energy (LCOE) of new projects added over the past decade in China and Brazil was USD 0.040/kWh, around USD 0.084/kWh in North

3 This takes into account that, when the PV systems are operating, they must produce 8GW of power, plus they must provide the power to pump water up to reservoir so that, when the system are not producing power to the full extent or not at all, such as at night, power can still be provided to meet peak demand in the evening and the mornings.

America and USD 0.120/kWh in Europe. For small hydropower projects (1-10 MW) the weighted average LCOE for new projects ranged between USD 0.040/kWh in China, 0.060/kWh in India and Brazil and USD 0.130/kWh in Europe.

This figure is probably too optimistic in terms of its cost. The cost for the proposed New England project will require massive dams (as touched upon previously in this paper) at both top and bottom plus pumps as well as turbines at the bottom. It has been suggested that the intention is to have massive wind and solar farms fairly close by, thus reducing input transmission losses to the pumps (and the need for long periods of constant hydro), but Armadale is a long way from Sydney and transmission losses could exceed 20%. The total infrastructure and environmental costs would be without precedent in this country.

For this example, we will choose the modest figure of US0.084/kWh (taking the US example which would have similar labour costs.) This comes to 10.6 cents Australian per kWh at present exchange rates.

So the total cost of the proposed pumped hydro solar & wind system, if it is practical at all, is likely to be in excess of **21 cents/kWh** for roof top solar with backup for reliable power supply. Now we should compare this with the cost of power generation using nuclear, coal and gas-fired facilities.

Comparison with Nuclear, Coal and Gas Generation Systems

The following graph produced by Jo Nova uses actual data from the National Electricity Market (Australia) data

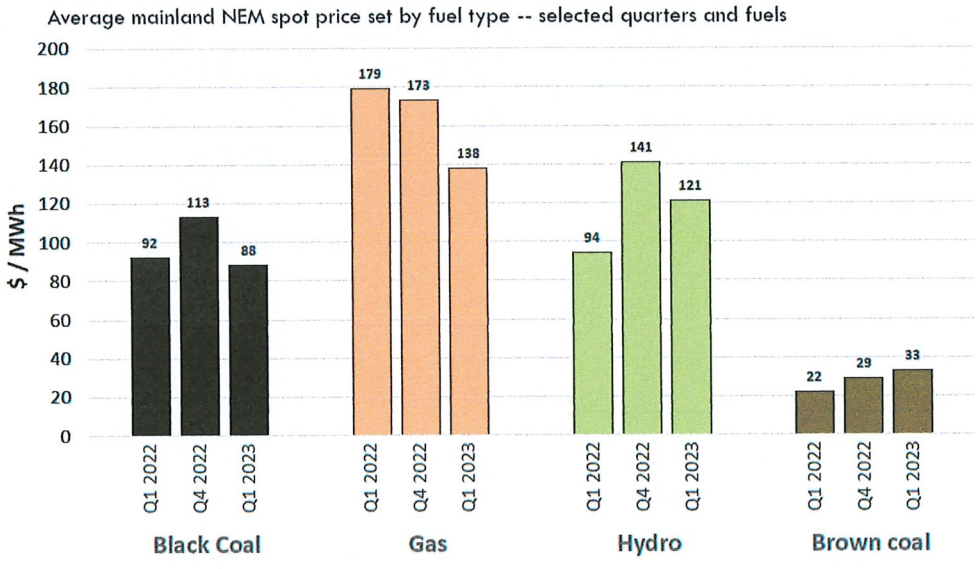


Figure 2: Cost per kWh of electricity produced by various means

This graph shows that brown coal is by far the cheapest way to produce electrical power. It should be noted that these cost are based on systems that have been in operation for a long time and so their cost of acquisition has been well and truly amortised.

It is very difficult to obtain factual pricing for (new-build) nuclear, coal and gas however, the order of economy appears to be coal, nuclear and then gas. I have included costs determined by the US Department of Energy as at 2019.

U.S. average levelized costs (2012 $/MWh) for plants entering service in 2019

Table 1: Indicative costs/kWh for various Electricity Generators in the US

Plant type	Capacity factor (%)	Levelized capital cost	Fixed O&M	Variable O&M (including fuel)	Transmission investment	Total system LCOE	Subsidy[1]	Total LCOE including Subsidy
Dispatchable Technologies								
Conventional Coal	85	60	4.2	30.3	1.2	95.6		
Integrated Coal-Gasification Combined Cycle (IGCC)	85	76.1	6.9	31.7	1.2	115.9		
IGCC with CCS	85	97.8	9.8	38.6	1.2	147.4		
Conventional Combined Cycle	87	14.3	1.7	49.1	1.2	66.3		
Advanced Combined Cycle	87	15.7	2	45.5	1.2	64.4		
Advanced CC with CCS	87	30.3	4.2	55.6	1.2	91.3		
Conventional *Combustion Turbine*	30	40.2	2.8	82	3.4	128.4		
Advanced Combustion Turbine	30	27.3	2.7	70.3	3.4	103.8		
Advanced Nuclear	90	71.4	11.8	11.8	1.1	96.1	-10	86.1
Geothermal	92	34.2	12.2	0	1.4	47.9	-3.4	44.5
Biomass	83	47.4	14.5	39.5	1.2	102.6		
Non-Dispatchable Technologies								
Wind	35	64.1	13	0	3.2	80.3		
Wind-Offshore	37	175.4	22.8	0	5.8	204.1		
Solar PV[2]	25	114.5	11.4	0	4.1	130	-11.5	118.6
Solar Thermal	20	195	42.1	0	6	243.1	-19.5	223.6
Hydro[3]	53	72	4.1	6.4	2	84.5		

According to this, the cost of a kWh of power generated from a newly built coal fired power station is 9.5 US cents. Advanced nuclear is 9.6 US cents. These are for new installations. The US fossil fuel installations face special taxes because of their "carbon" pollution so, without these, the costs would be significantly less and closer to the graph shown above. China retails its electrical power for around US 5 cents/kWh. The costs attributed to nuclear are also controversial and likely to be inflated here.

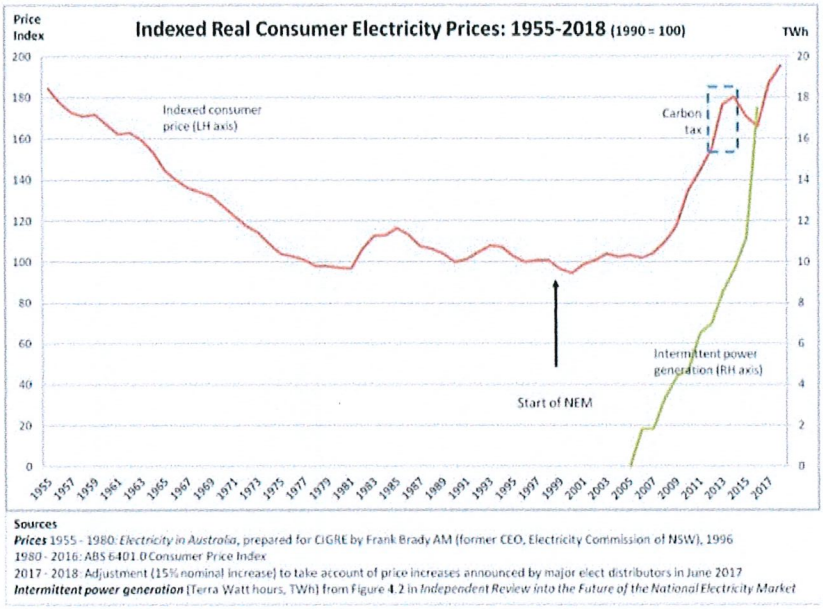
The US figures therefore are likely to be on the high side compared to what would be experienced in Australia. We shall therefore estimate that **the present day cost of generating electricity using coal or nuclear is around AU 10 cents/kWh**.

It is noteworthy that Australian coal-fired power generation was, before the introduction of intermittent power sources into the network, amongst the cheapest in the world. Here is what has happened to the cost of electrical power after the Labor Government started its drive towards "renewables"

Figure 3: Cost of Electricity in Australia vrs Consumer Price Index

It can be seen that energy in Australia has risen by around 550% higher than the Consumer Price Index over the same period; starting in late 2007 through to 2018. The cost of electricity still rises on the same trajectory. Any suggestion, by advocates of this scheme, that they will achieve a 10% reduction in energy costs has to be viewed against this backdrop. There is a need to reduce energy costs by at least 550% to get back to the situation that existed in 2007-2008. Government could improve on that figure if it adopted coal and nuclear power generation and prevented the unreliable, intermittent inject of power from solar and wind into the network.

The following graph appears to show a correlation between the amount of power being injected intermittently into the grid and the resultant cost of electricity as a consequence.



If Australia is to have the cheapest and most reliable electricity possible, it is imperative that the injectiion of intermittent power into the grid be stopped. If unreliable solar and wind are to be used, they must be backed up by a storage system that ensure input will be reliable and variable according to demand.

Summation

The idea of having pumped hydro driven largely by roof-top solar systems that must be scrapped after 25 years, using components that are largely built in China, appears to carry a high level of risk and will not deliver the cheapest energy to Australian industry and society. This study suggests that:

1. The cost of electricity created by the proposed pumped-hydro, solar and wind scheme will be in the **order of at least AU 21 cents per kWh wholesale**.
2. The cost of producing electricity using coal or nuclear, without the disruption of intermittent injection of power by "renewables", is likely to be significantly less than **AU 10 cents per kWh**.

Experience suggests it is likely that nuclear energy will be slightly cheaper than coal; especially if modular nuclear reactors are collocated at existing coal fired power generation facilities. Nuclear is also an interesting study because if Australia were to develop a nuclear processing and reprocessing industry, it has the potential to earn Australia many billions of dollars per year reprocessing the reactor rods of other countries. This would also aid in preventing nuclear weapons proliferation by tightly controlling the access to fissile material. Any country that did not return its rods for reprocessing would not receive any more enriched uranium.

Given the core justification for pursuing this method of power generation is to reduce emissions, the pumped-hydro project appears to be imprudent and a great waste of taxpayers' money.

- End -

Annex: A. LtCol(Ret'd) K.A. Loughrey, "THE NON-EFFECT OF CARBON DIOXIDE ON WARMING THE EARTH'S ATMOSPHERIC TEMPERATURE", dated 11 June 2024

ANNEX A
TO AN OBJECT EXAMPLE OF THE INFEASIBILITY OF "RENEWABLE" ENERGY SOLVING THE ENERGY NEEDS OF NEW SOUTH WALES(NSW)
DATED 11 June 2024

THE NON-EFFECT OF CARBON DIOXIDE ON WARMING THE EARTH'S ATMOSPHERIC TEMPERATURE

By LtCol Kevin Loughrey(Ret'd), BE Mech(Hons), Grad Dip Strategic Studies(ANU)

The Alleged Cause of Global Warming

It is asserted by some scientists that Carbon Dioxide(CO_2), Nitrous Oxide(N_2O) and Methane(CH_4) are catastrophically warming the atmosphere. Based on this assertion, these scientists, and those politicians and people who are adherents to this belief, demand that mankind dramatically reduce the emissions of these gases. In the agreements reached so far, major emitters of these gases such as Communist China and India are exempt from these restrictions.

But what if the earth's atmosphere is not warming but instead cooling? Would this not put an end to this thesis given that the concentration of CO_2 has been rising steadily for around a century?

Data taken from Ice Cores show no Correlation between CO2 and Atmospheric Temperature

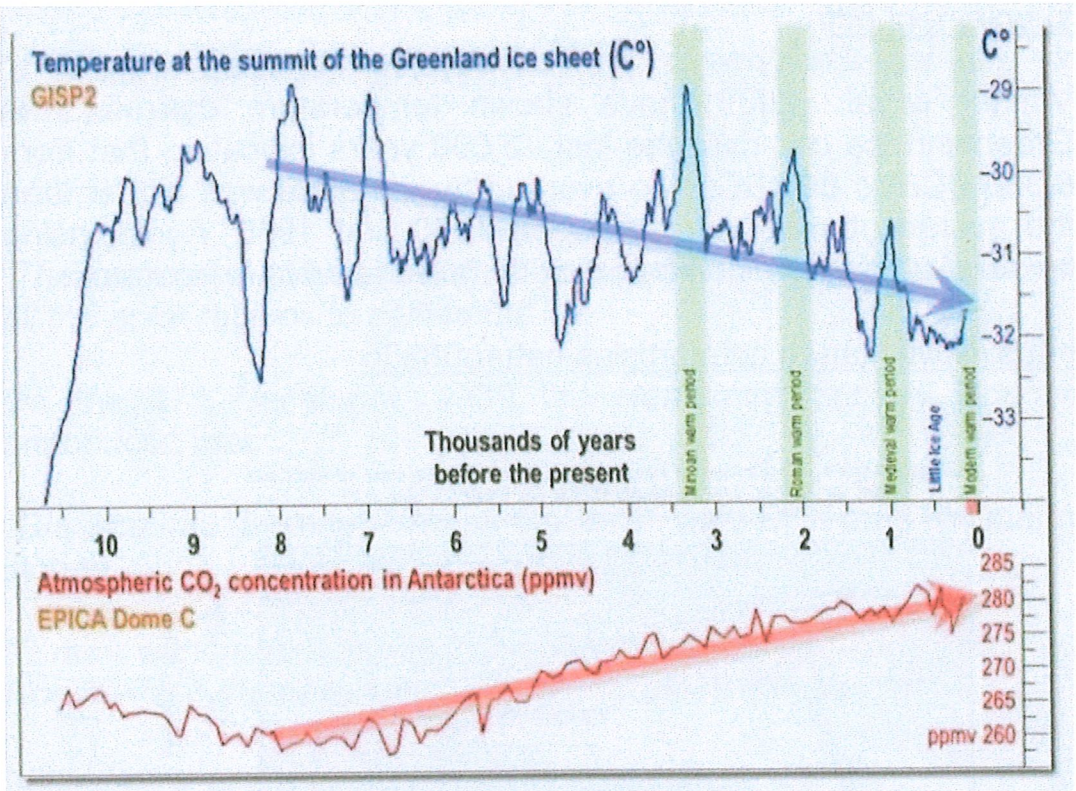


Figure 4: As CO2 Concentration increases, Atmospheric Temperature decreases

Figure 4 displays data, extracted from ice cores in Greenland, pertaining to atmospheric temperature and CO_2 concentration over a period of 10,000 years. The graph shows that, whilst CO_2 has been slowly increasing, the temperature of the atmosphere has been gradually, in fits and starts, decreasing. From

this, it can be seen that CO_2 has no appreciable warming effect on the earth's atmosphere. Given this fact, reducing human emissions of CO_2 is a case of solving a problem that doesn't exist. The above relates to a period of 10,000 years. What about closer to the present day? Let's now look at the temperature data from every major climatology network around the world.

Raw Data from Numerous Climatology Networks all show the same Trend – Downwards!
Here are plots of raw temperature data taken from weather stations of long standing around the world that have not been encroached upon by urbanisation; something that would artificially exaggerate the real situation with respect to the atmospheric temperature close to Earth's surface.

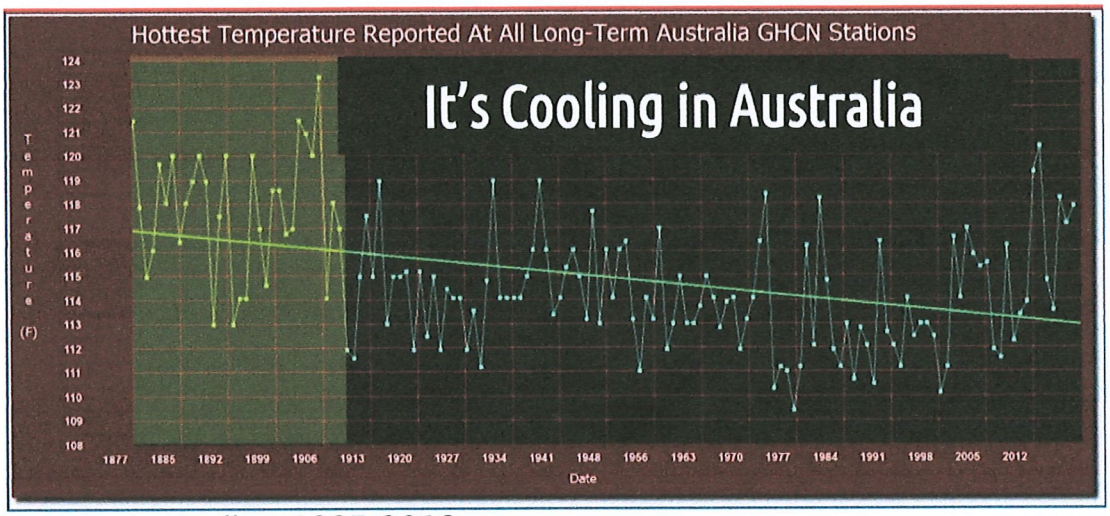


Figure 5: Australia - 1885-2019

According to Figure 5, from 1885 to around 1998, Australia's climate has been cooling. After 1998, the temperature record is broken because the Bureau of Meteorology:

- replaced the analogue measuring systems with digital technology,
- used digital equipment *incapable* of reading temperatures below -10C,
- did not reveal data showing that the results of the two systems when running in parallel produced differing readings and the new system has never been properly calibrated against the analogue system in order to ensure that temperature comparisons would be from the same reference base,
- put the new equipment in smaller housings (called Stevenson Screens) causing them to record a higher temperature, and
- painted the insides of the boxes black[4] so that they radiate onto the measuring equipment – once again causing higher temperatures to be registered.


Figure 6: A Stevenson Screen

Was this incompetence or was it a deliberate ploy to gain Government grants?
So what about the rest of the world? Figures 7 to 12 show the same trend. Temperatures have been on a gradual decline whilst the concentration of CO_2 in the atmosphere has been steadily rising.

4 I was told this by the Hon Craig Kelly MP but haven't been able to verify this. It may not have been a consistent practice or this may have been corrected in some or all of the latest Stevenson Screens.

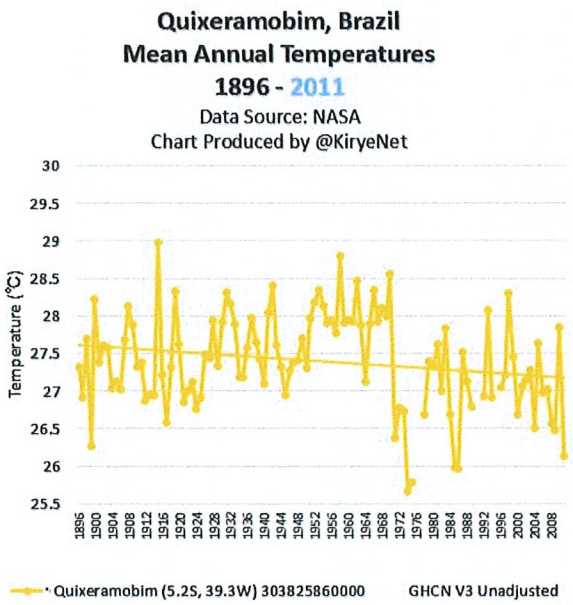


Figure 7: Brazil - 1896 -> 2011

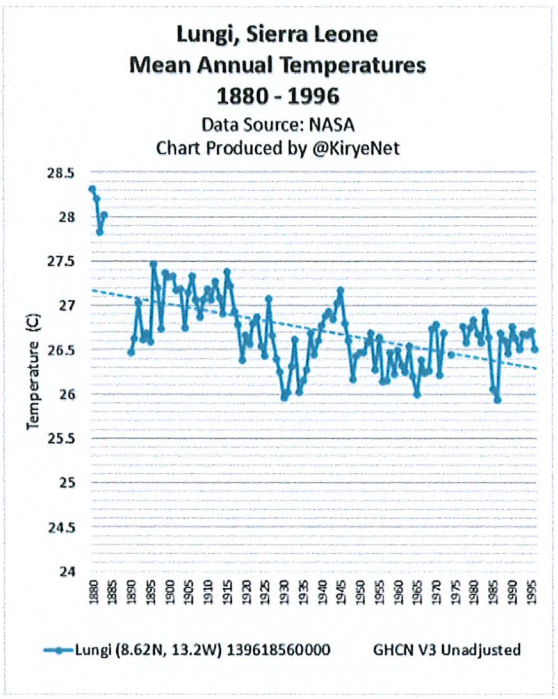


Figure 8: Sierra Leone Africa 1880-1996

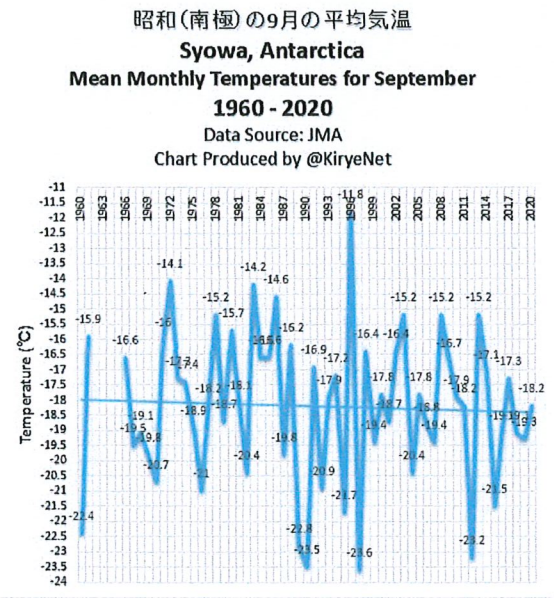


Figure 9: Antarctica 1960->2020

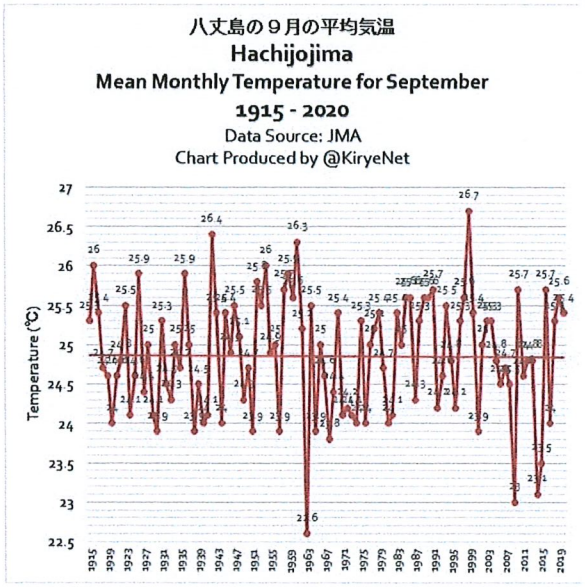


Figure 10: Japan 1915-2020

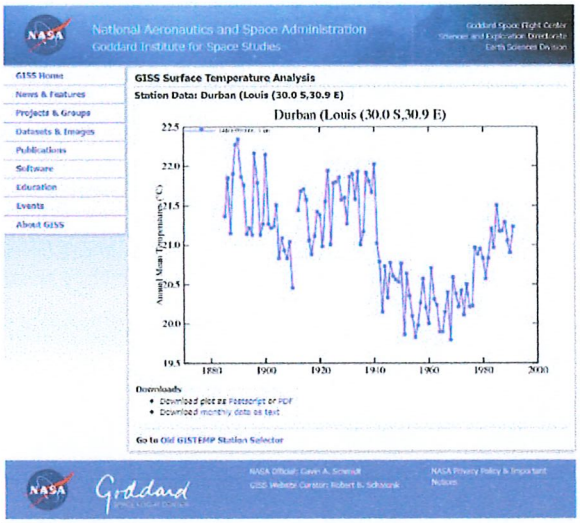


Figure 11: Durban Sth Africa 1885-1995

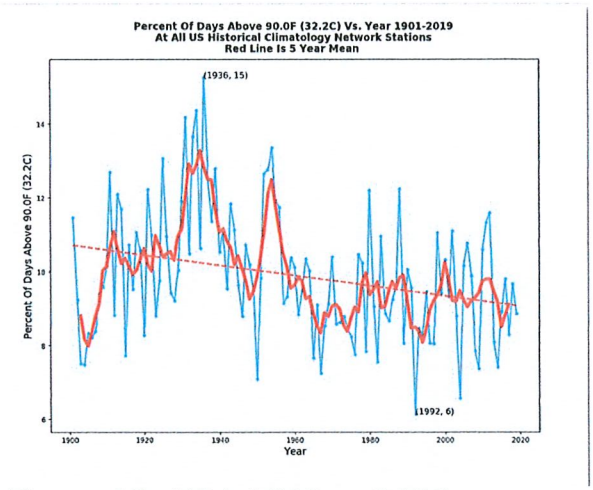


Figure 12: USA 1901-> 2019

The Chances of this being an error are Zero!

Given that these temperature measuring networks recorded their data in isolation of each other because of the lack of global communications in those days, it is an impossibility that they could all be wrong. How is it then, that we are constantly being told that the world will end in a fireball when all historical data show exactly the opposite?!

Carbon Dioxide Concentration during this Period

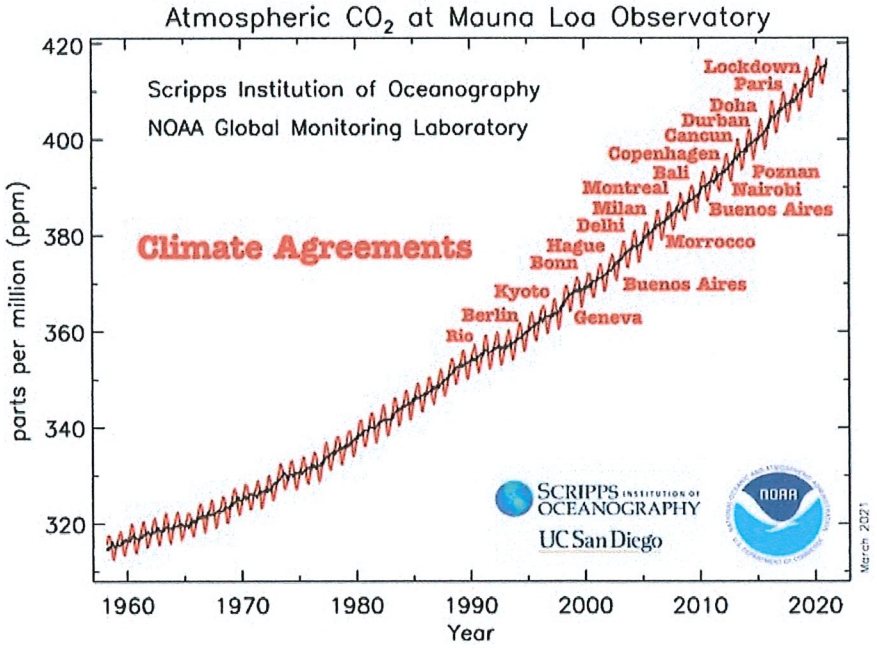


Figure 13: Rising CO2 Concentration for last 60+ years

Figure 13 shows the rise of concentration of CO2 in the earth's atmosphere from approximately 1957 to the 2022. During this time, as shown above, all raw data shows that the temperature of the atmosphere has been dropping or, at the very least, has remained relatively stagnant. Therefore, even with data from a very short time-frame in geological terms, it can be seen that there is no appreciable relationship between the concentration of CO2 in the earth's atmosphere and its average temperature. Certainly, in terms of maximum temperatures there appears to be no difference and even a decline.

A Congregation of the Evil and Wicked

If there is no connection between the concentration of CO_2 in the earth's atmosphere and its temperature, why then are there persons and organisations in this world trying to limit the emissions of CO_2. The reason is quite simple. It is about crippling energy production in Western economies and, by that means, destroying the prosperity of those affected because inexpensive, reliable energy is the foundation stone of any modern prosperous nation.

What you are seeing is very similar to what you saw with the lies promulgated about COVID-19. COVID-19 (alpha) was a disease that was no more dangerous than Influenza if people were given early treatment with a range of low cost medicines. But the use of these treatments was bizarrely banned by Western Governments worldwide! Doctors have been denied the opportunity to properly care for their patients and many have been deregistered for speaking out. Millions of people have died unnecessarily. The wealthy elite have greatly increased their fortunes, just as they are doing with "Climate Change", whilst the middle class and the poor have been further impoverished.

Interestingly, the same people involved in the Climate Change movement were behind COVID-19. These are:

- large financial institutions with massive investments in the Pharmaceutical Industry but also in "renewable" energy technology.
- The World Economic Forum, an organisation aiming to destroy Western economies so as to precipitate a "Great Reset".
- People who just generally hate humanity and believe the world's population should be culled.
- The Chinese Communist Party (CCP), a huge criminal cabal that wants to be the dominant power of the world by 2049, the 100th year of the reign of the CCP of China. The CCP has benefited hugely from "Climate Change". Nearly all renewables hardware is purchased from China and they have not had to reduce their emissions at all so their electricity is 5 times cheaper than most countries comprising the Western economies.

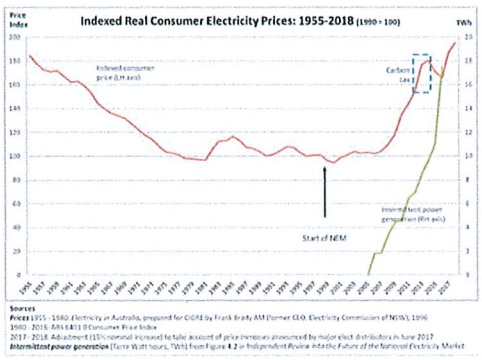


Figure 14: Electricity Cost and effect of Injection of Renewable Power

Figure 14 shows that there is a direct correlation between the cost of electricity in Australia and the injection of intermittent power from appliances like roof top solar and windmills.

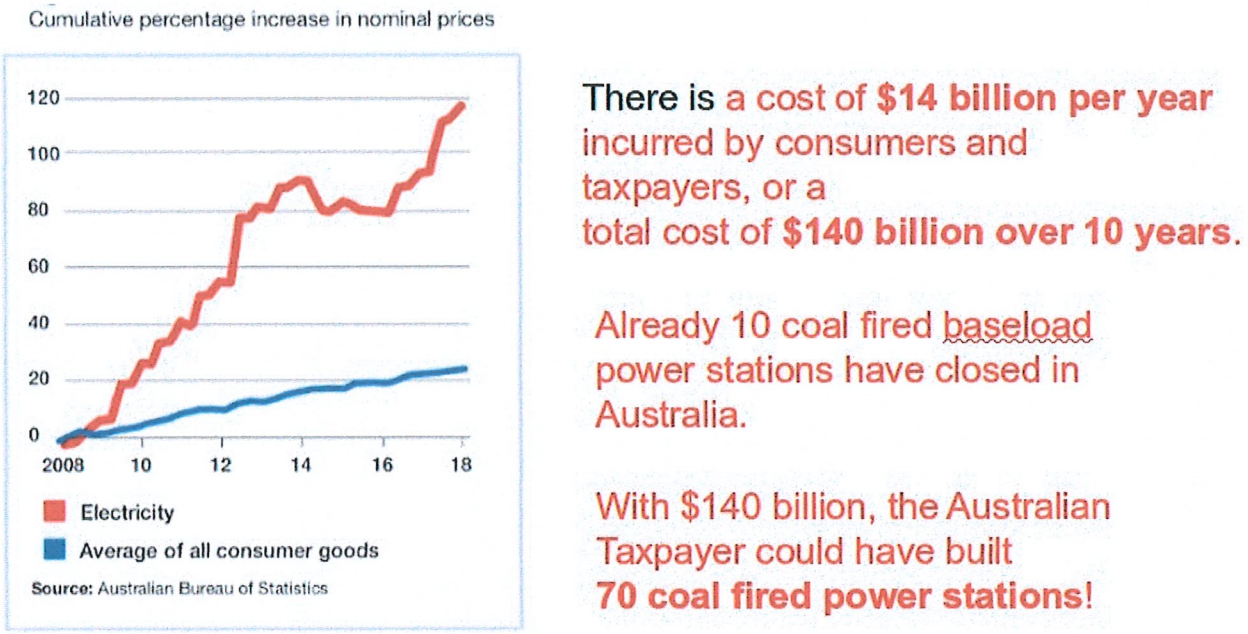
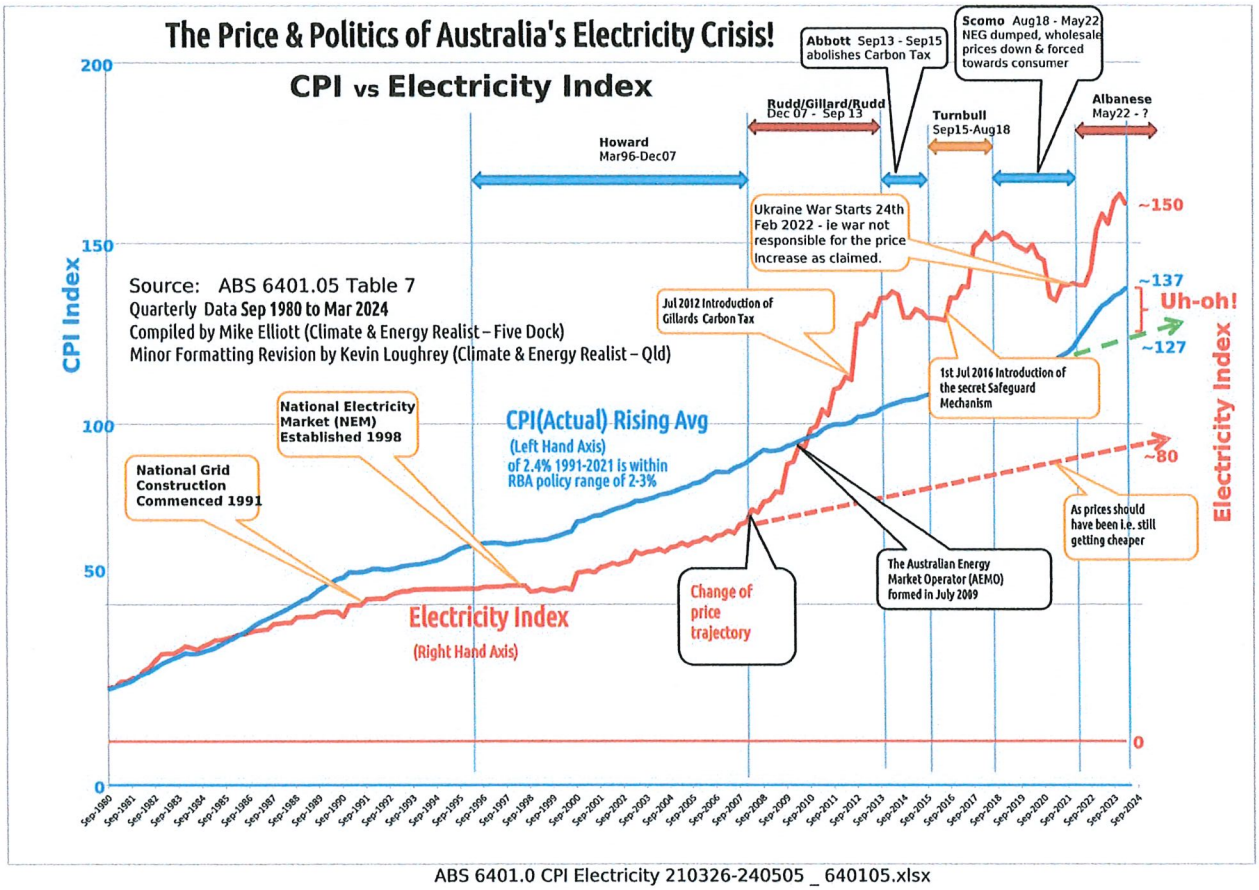


Figure 15: The rising cost of electricity compared to the Consumer Price Index

As per Figure 15, the cost of electricity has risen by more than 6 times the Consumer Price Index whilst, all the time, the Australian public has been assured that renewable energy would be cheaper. Clearly it is not!



ABS 6401.0 CPI Electricity 210326-240505 _ 640105.xlsx

Figure 16: Comparison of the Cost of Electricity against Consumer Price Index with annotations

Figure 16 provides more detail regarding the rapidly increasing cost of electricity as a consequence of the introduction of intermittent power systems in the form of wind and solar generators.

Cheap reliable energy is the foundation stone of any modern society. With energy costs many times greater than that of Communist China, Australia is well on the way to being both impoverished and vulnerable to take-over by foreign interests.

The Path to Salvation

It would be comparatively simple to rectify what has happened:

1. Carry out a massive public relations campaign to prove to the public that they have been misled. CO_2 does not appreciably warm the earth's atmosphere and, in fact, the extra concentration of this gas is doing enormous good. This education of the public is critically important because without that, there will not be the political will to carry out other reforms that will be necessary if Western economies will once again have inexpensive, reliable energy to drive their industries and their economies.
2. Abolish all subsidies related to energy generation of any sort.
3. Abolish any regulations that mandate in any way the use of "renewables" and "renewable" energy.
4. Revert to the way that electricity was generated before 2007. It is madness to inject power intermittently into a power grid.
5. Explore the feasibility of placing modular nuclear reactors, based on the latest proven technology, at some existing power stations where that is cost effective. (If this were commercially viable, the cost and time needed to transition to nuclear technology would be far, far less than building new base-load power generating facilities, based upon nuclear technology, from scratch.)

If we fail to do this, the future for our children, grandchildren and their successors looks extremely bleak.

-End of Paper -

II. A Cloud Thermostat Controls the Earth's Climate, Not Greenhouse gasses!
and
I. Climate change is a myth!

John F. Clauser, retired experimental and theoretical physicist,
2022 Physics Nobel Laureate, Climate Change Denier
[redacted],
[redacted]

Zoom Lecture May 8, 2024
Irish Climate Science Forum & CLINTEL

Part I. Climate change is a myth -1.

- The IPCC and its collaborators have been tasked with computer modeling and observationally measuring two very important numbers – the Earth's so-called power imbalance, and its power-balance feedback-stability strength. They have grossly botched both tasks, in turn, leading them to draw the wrong conclusion.
- I assert that **the IPCC has not proven global warming**! On the contrary, observational data are fully consistent with no global warming. **Without global warming, there is no climate-change crisis!**
- Their computer modeling (GISS) of the climate is unable to simulate the Earth's surface temperature history, let alone predict its future.

Part I. Climate change is a myth -2.

- Their computer modeling (GISS) is unable to simulate anywhere near the Earth's albedo (sunlight reflectivity). The computer simulated sunlight reflected power and associated power imbalance error, are typically about fourteen times bigger than the claimed measured power imbalance, and about twenty five times bigger than the claimed measured power imbalance error range.
- The IPCC's observational data are wildly self-inconsistent and/or are fully consistent with no global warming.
- The IPCC's observational data claim an albedo for cloudy skies that is inconsistent with direct measurements by a factor of two. Alternatively, their data **significantly violate conservation of energy**.

Part I. Climate change is a myth -3.

- Scientists performing the power-balance measurements admit that the available methodologies are incapable of measuring a net power imbalance with anywhere near the desired accuracy. This difficulty is due to huge temporal and spatial fluctuations of the imbalance, along with gross under-sampling of the data.
- The observational data they report are self-inconsistent and are visibly dishonestly fudged to claim warming. The fudged final reported values, herein highlighted and exposed, are an example of the **proverbial proliferation of bad pennies.**
- NOAA's claims that there is an observed increase in extreme weather events are bogus. Their own published data disprove their own arguments. A 100 year history of extreme weather event frequency, plotted frontwards in time is virtually indistinguishable from the same historical data plotted backwards in time.

Part I. Climate change is a myth -4.

- In Part II, I present the **cloud-thermostat feedback mechanism**. My new mechanism dominantly controls and stabilizes the Earth's climate and temperature. The IPCC has not previously considered this mechanism. The IPCC ignores cloud-cover variability.

The IPCC's two sacred tasks – both botched! -1

1. The IPCC and its collaborators have been tasked with computer modeling and observationally measuring two very important numbers – the Earth's so-called power imbalance, and its power-balance feedback-stability strength.
2. The Earth's net power imbalance is its sunlight heating power (its power-IN), minus its two components of cooling power - reflected sunlight and reradiated infrared power (its power-OUT).
3. Based on their claimed power imbalance and global-warming assertion, the IPCC and its collaborators assemble a house of cards argument that forebodes an impending climate change apocalypse/catastrophe.
4. Additionally, the IPCC and its contributors calculate the strength of naturally occurring feedback mechanisms that presently stabilize the Earth's temperature and climate.

The IPCC's two sacred tasks – both botched! -2

5. They claim only marginal effectiveness for these mechanisms, and correspondingly assert that there is a "tipping point", whereinafter further added greenhouse gasses catastrophically cause what amounts to a thermal-runaway of the Earth's temperature.
6. The IPCC scapegoats atmospheric greenhouse gasses as the cause of global warming, and further mandates that trillions of dollars must be spent to stop greenhouse gas release into the environment with a so-called "zero-carbon" policy.
7. The IPCC also mandates multi-trillion dollar per year geoengineering projects including Solar Radiation Management Systems to stabilize the Earth's climate and CO_2 capture projects to reduce the atmospheric CO_2 levels.

The IPCC's two sacred tasks – both botched! -3

8. I assert that the IPCC and its contributors have not proven global warming, whereupon their house of cards collapses.
9. My cloud thermostat mechanism's net feedback "strength" (the IPCC's 2nd sacred task to estimate) is anywhere from -5.7 to -12.7 W/m^2/K (depending on the assumed cloud albedo, 0.36 vs. 0.8), compared to the IPCC's botched best estimate for their mechanisms of -1.1 W/m^2/K. My mechanism's overwhelmingly dominant strength confirms that it is the dominant feedback mechanism controlling the Earth's climate.
10. **Correspondingly, I confidently assert that the climate crisis is a colossal trillion-dollar hoax**.

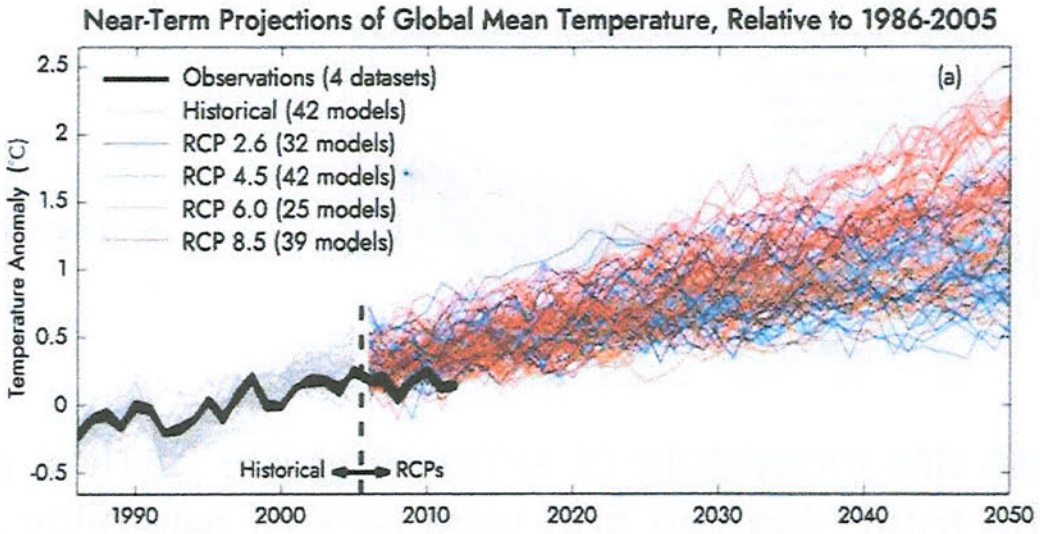
The IPCC's basic argument is a flawed house of cards: -1

1. The IPCC claims with great certainty that the Earth has a (proven) net power imbalance. It claims that there is more sunlight power incident on the Earth heating it, than there is lost power cooling it. The lost power has two forms reflected sunlight and reradiated far infrared radiation.
2. More power IN than power OUT defines global warming! The IPCC claims a net warming power imbalance!
3. Global warming leads to climate change.
4. Climate change leads to an increased frequency of extreme weather events and other bad phenomena.
5. An increased frequency of extreme weather events leads to global apocalypse and a climate crisis. NOAA claims to have observed an increase. (Their claims are visibly bogus.)

The IPCC's basic argument is a flawed house of cards: -2

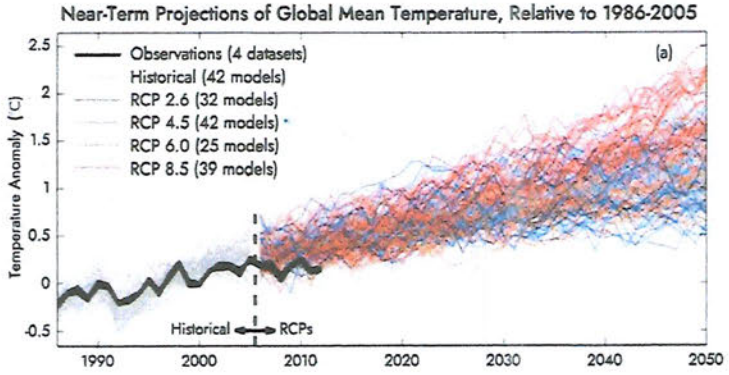
6. The IPCC's claimed net warming power imbalance is claimed to be caused by an atmospheric buildup of greenhouse gasses, especially of CO_2.
7. Trillions of dollars must therefore be spent to limit, prevent, and reverse the atmospheric buildup of greenhouse gasses.
8. **However, given that said claimed net warming power imbalance is not proven, and there is actually no global warming, then there is no crisis and the house of cards has collapsed.**
9. **I assert that the IPCC's claimed net power imbalance is not proven, and that there is no crisis. The house of cards has indeed collapsed! The requested trillions of dollars are a waste.**

The IPCC's computer modeling uses flawed physics to estimate the Earth's temperature history -1



- The above graph is copied from [AR5, (IPCC, 2013) Fig 11.25].
- It shows the IPCC's CMIP5 computer modeling of the Earth's temperature "anomaly". The various computed curves display the earth's predicted (colored) and historical (gray) "temperature anomaly".
- The solid black curve is the observed temperature anomaly.

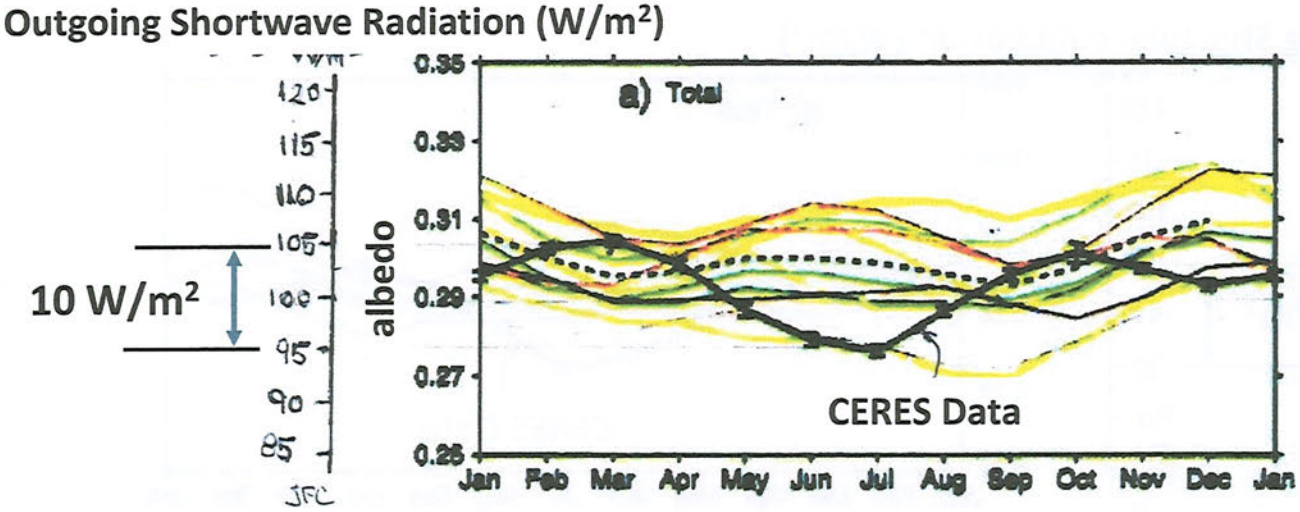
The IPCC's computer modeling uses flawed physics to estimate the Earth's temperature history -2



(Repeat 1)

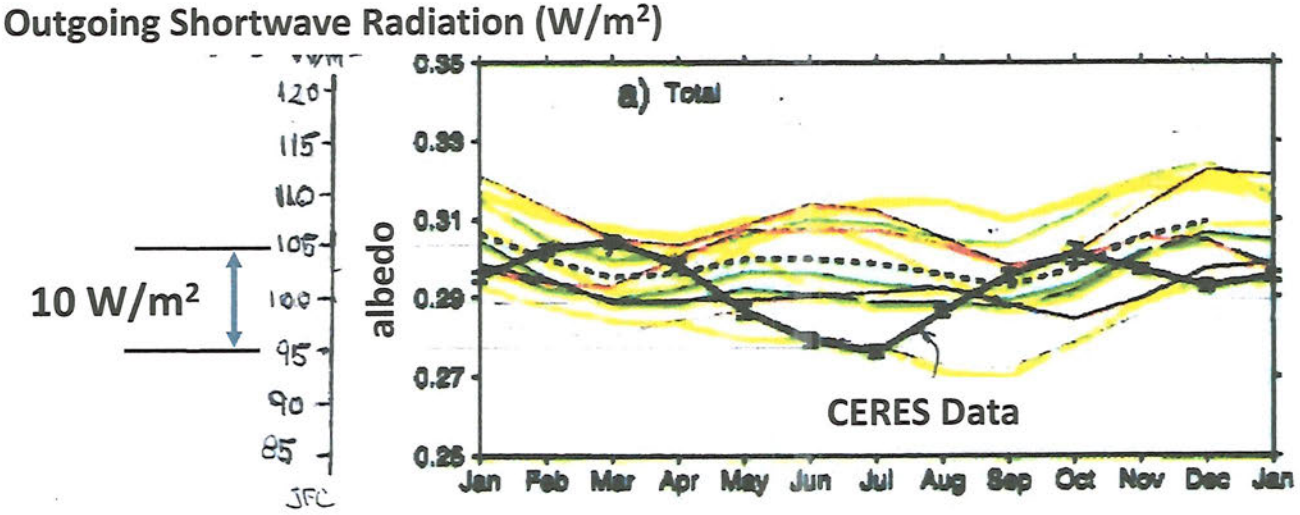
- Note that all 40+ models are incapable of simulating the Earth's past temperature history. The total disarray and total lack of reliability among the CMIP5 predictions was first highlighted by Steve Koonin (former White House science advisor to Barack Obama) in his recent book- *Unsettled*? *What climate science tells us, what it doesn't, and why it matters.*
- **Something is obviously very wrong with the physics incorporated within the computer models, and their predictions are totally unreliable.**

The IPCC's computer modeling uses flawed physics to estimate the Earth's albedo -1



- Albedo is the fraction of sunlight power that is directly reflected by the Earth back out into space. (OSR=100 W/m^2 portion of power-OUT)
- The above Figure, copied from Stephens et al. (2015), shows the IPCC's CMIP5 computer modeling (colored curves) of the Earth's mean annual albedo temporal variation. The solid black curve is the Earth's albedo measured by satellite radiometry. (The variation is not sinusoidal.)

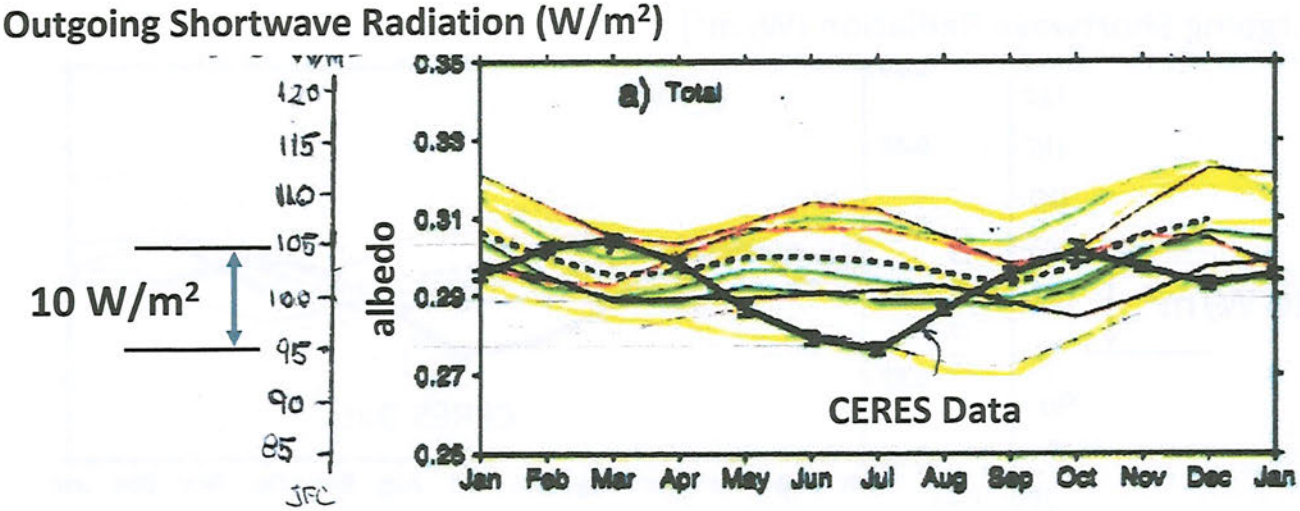
The IPCC's computer modeling uses flawed physics to estimate the Earth's albedo -2



(Repeat 1)

- The added scale shows the associated reflected sunlight power. It assumes a constant solar irradiance – 340 W/m².
- Note that the IPCC's computer modeling is grossly incapable of simulating the observed Earth's reflected power, and especially incapable of simulating that power's dramatic temporal fluctuation.

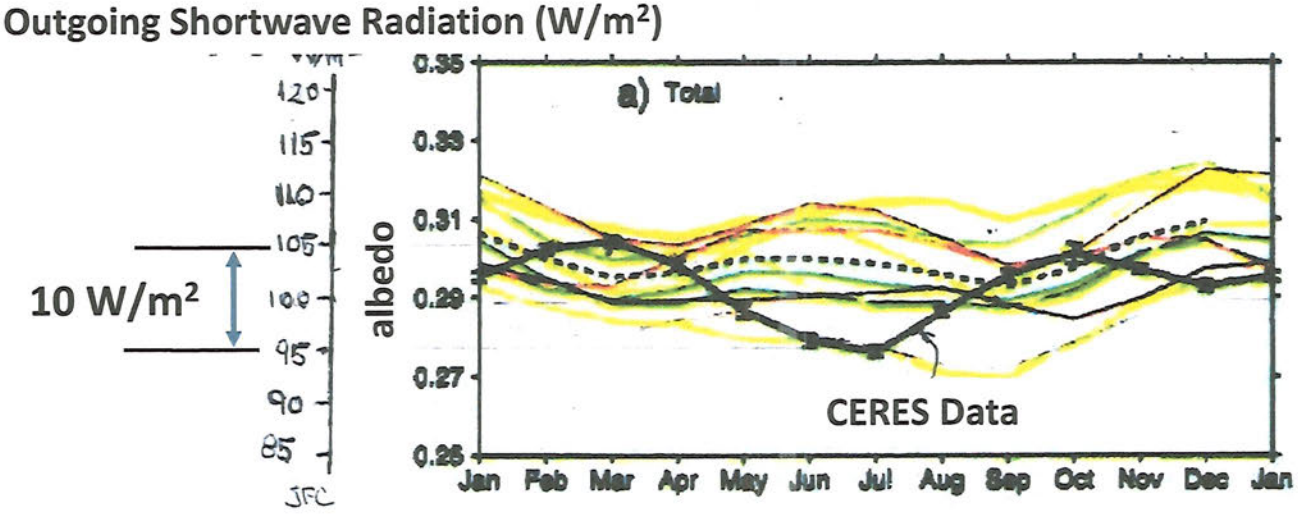
The IPCC's computer modeling uses flawed physics to estimate the Earth's albedo -3



(Repeat 2)

- The actual power's annual variation is actually much greater than is shown by this Figure by about 18 W/m², due to the ellipticity of the Earth's orbit and the associated sinusoidal temporal variation of the so-called solar constant.

The IPCC's computer modeling uses flawed physics to estimate the Earth's albedo -4



(Repeat 3)

- Despite more than 10 W/m² gross errors in the computer simulation's calculated reflected power, as is shown on the Figure, the IPCC [AR6 (2021)] still claims that it has computer simulated and precisely measured this power, yielding an imbalance that is equal to 0.7 ± 0.2 W/m². – **Huh?**

The IPCC's observational data are consistent with NO global warming - 1

- Power-IN is the sunlight power incident on the Earth. The IPCC and climate scientists call it Short Wavelength (SW) Radiation. It is about 340 Watts per square meter of the Earth's surface area. (It is not actually constant, but varies ± 9 W/m^2.)
- Power-OUT has two components:
  - One component is the sunlight energy that is directly reflected by the Earth back out into space, whereinafter it can no longer heat the planet. That component is claimed by the IPCC to be about 100 W/m^2.
  - The other component is the far-infrared heat radiated into space by a hot planet. It is claimed to be about 240 W/m^2. The IPCC calls the far-infrared heat radiation component, Long Wavelength (LW) Radiation.

The IPCC's observational data are consistent with NO global warming - 2

- Measuring the power imbalance consists of measuring power-IN, measuring power-OUT and subtracting. Simple enough? Not really. The problem is that power-IN, and power-OUT are huge numbers, and that the difference between them is miniscule - 0.2% of power-IN. That miniscule difference is the net imbalance that is sought, both experimentally and theoretically.

  Unfortunately, it is so small that it is very difficult, if not impossible, to measure to the desired accuracy, 0.1 W/m^2, or 0.03% of power-IN. It is much tougher to measure when power-IN and power-OUT are both also hugely varying in a seemingly random irreproducible fashion. Large variations occur both in time and in space over the surface of the Earth. As noted in a previous slide, this grossly under-sampled fluctuation is about 28 W/m^2, compared with the IPCC's claimed imbalance, 0.7 ± 0.2 W/m^2.

The IPCC's observational data are consistent with NO global warming - 3

- A variety of methods has been employed to measure these powers. They include satellite radiometry, (the ERBE, and CERES Terra and Aqua satellites), ocean heat content (OHC) measured using the ARGO buoy chain and XBT water sampling by ships, and finally by ground sunlight observations using the Baseline Surface Radiation Network (BSRN).

- The various measured values are all in wild disagreement with each other. Importantly, none of the reported data actually show a convincing net warming power imbalance. Importantly, much of the reported data are totally fudged in a manner that dishonestly changes them from showing no warming to showing warming!

What is the basic power-imbalance calculation? It is really quite simple - 1.

Observers' data are usually reported on a Figure that shows a map of the claimed power flow.

The imbalance is conventionally reported at the Top Of Atmosphere (TOA).

The three needed numbers are readily available from the top line of the power-flow diagram.

If you don't believe my claims of fudging, it's easy enough to freely download the articles, pull the numbers from the various power-flow diagrams, and verify the arithmetic yourself!

A typical calculation is shown on the next slide:

What is the basic power-imbalance calculation? It is really quite simple - 2.

A typical calculation is as follows:

Incident ShortWave power	+340	W/m^2	$\pm \sigma_{IN}$
Outgoing ShortWave reflected power	-100	W/m^2	$\pm \sigma_{SW\text{-}OUT}$
Outgoing LongWave reemitted power	-240	W/m^2	$\pm \sigma_{LW\text{-}OUT}$
Sum=Net "observed" power imbalance	IMBALANCE		$\pm \sigma_{IMBALANCE}$

$\sigma_{IMBALANCE} = (\sigma_{IN}^2 + \sigma_{SW\text{-}OUT}^2 + \sigma_{LW\text{-}OUT}^2)^{1/2}$. (RMS sum)

RMS sum crosscheck: $\sigma_{IMBALANCE} > \sigma_{IN}$, $\sigma_{IMBALANCE} > \sigma_{SW\text{-}OUT}$, $\sigma_{IMBALANCE} > \sigma_{LW\text{-}OUT}$.

no global cooling	if	IMBALANCE	$\leq$	$\sigma_{IMBALANCE}$
global warming	if	IMBALANCE	$>$	$\sigma_{IMBALANCE}$

Fudged arithmetic is highlighted in red on the next slides. (Follow the proverbial bad penny.)

The earliest data are reported by Stephen's *et al.* (1981) and Ramanathan (1987) - 1.

- Their results are based on only four partially analyzed months of observation by the ERBE satellite – (Apr. 1985, July 1985, Oct. 1985, Jan. 1986). (c.f. observed non-sinusoidal albedo annual oscillation.)
- Their resulting Top of Atmosphere net power imbalance results are as follows:

	Stephens *et al.* (1981)	Ramanathan (1987)
Incident ShortWave power (W/m^2)	+344	+340
Outgoing ShortWave power	-103.2	-106
Outgoing LongWave power	-234±7	-237
Net "observed" power imbalance	+9 ± 10	0
jfc calculation	**+6.8**	**-3**

- Both Stephens et al. and Ramanathan's data are fully consistent with zero net global warming and/or cooling.

The earliest data are reported by Stephen's *et al.* (1981) and Ramanathan (1987) - 2.

- The 2003 US National Academy / National Research Council report "*Understanding Climate Change Feedbacks* (p.112)" cites the Ramanathan (1987) data, and comments that "*The observations do not meet quality standards*."

Loeb *et al.* (2009, 2012) use OHC data to "adjust" Ramanathan's (1987) numbers, to show a net warming power imbalance - 1.

- Loeb *et al.* (2012, p.111) admit "*A limitation of the satellite data is their inability to provide an absolute measure of the net TOA radiation imbalance to the required accuracy level.*"
- Loeb *et al.* (2009, 2012) reanalyze and arbitrarily replace Ramanathan (1987)'s (very sparsely sampled) EREB satellite data with new values that now show a net global warming power imbalance.
- They obtain their new preferred data values by switching modality from satellite-radiometry data to ocean heat content (OHC) data (also very sparsely sampled) from the ARGO buoy chain, and from XBT ship-based bathythermograph manually sampled water temperature data.
- They base their action on a claimed increase in ocean heat content, as per speculation by Hansen *et al*, (2005, 2011).

Loeb *et al.* (2009, 2012) use OHC data to "adjust" Ramanathan's (1987) numbers, to show a net warming power imbalance - 2.

- Unfortunately, the ARGO and XBT data have a woefully sparse area sampling, and much worse accuracy than Loeb *et al.* claim. Data gaps are filled using totally fabricated data by Lyman and Johnson (2008). (Data fabrication is one of our scientific little no-no's.)
- Their resulting Top of Atmosphere net power imbalance results:

	EREB satellite	*OHC (2009)*	*OHC (2012)*
Incident ShortWave power (W/m^2)	+340	+340	
Outgoing ShortWave power	-107	-99.5	various
Outgoing LongWave power	-234.6	-239.6	
net power imbalance	-1.6 (cooling)	+ 0.9 (warming)	+0.64 ± 0.11 (warming)

THE BAD PENNY

Remember this proverbial BAD PENNY. It will show up again and again, and again.

Power imbalance analysis by Stephens *et al.* (2012) with grossly admittedly-fudged error estimates - 1

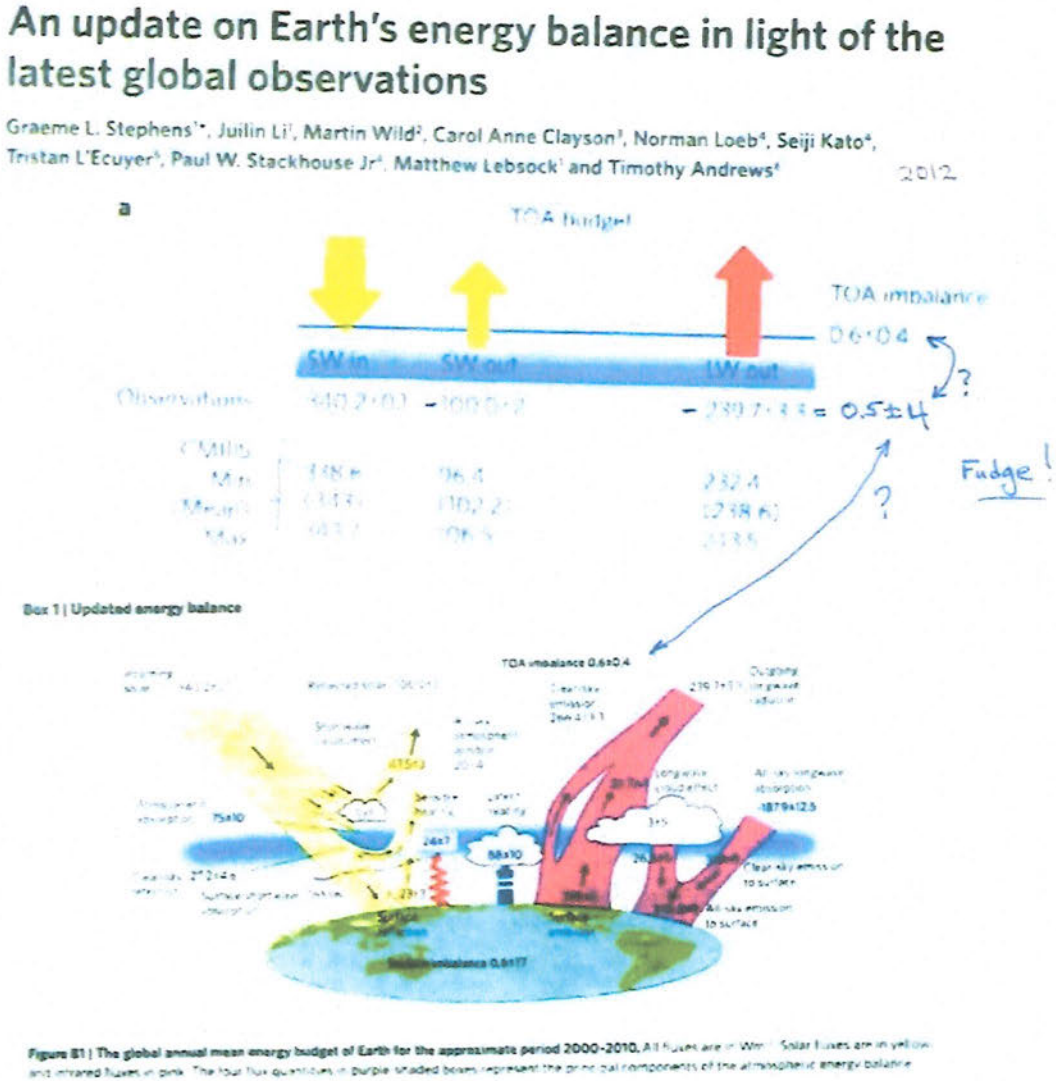
- Following Loeb *et al.*, Stephens *et al.* (2012) also admit that satellite data are incapable of observing a net imbalance! The groups join forces and switch to the use of Ocean Heat Content (OHC) data, as per the suggestion by Hansen *et al*, (2005, 2011).
- Stephens *et al.* (2012) use OHC data and the Outgoing ShortWave power "adjustment" (fudge!) reported earlier by Loeb *et al.* (2009, 2012) to claim a net global-warming power imbalance (the BAD PENNY reappears!):

Incident ShortWave power (W/m^2)	+340.2 ± 0.1
Outgoing ShortWave power	-100.0 ± 2.0
Outgoing LongWave power	-239.7 ± 3.3
Net "claimed observed" power imbalance	+0.6 ± 0.4 ← recurring BAD PENNY (fudged warming)

Actual summation & assoc. RMS error (jfc) +0.5 ± 3.9 (no warming)

Power imbalance analysis by Stephens *et al.* (2012) with grossly admittedly-fudged error estimates - 2

- Stephens *et al.*'s use of (visibly) incorrect arithmetic is yet another one of our scientific little no-no's. RMS error sum crosscheck NG.
- Loeb *et al.* (2012)'s BAD PENNY error limits are increased from ± 0.11 to ± 0.4.



Stephens *et al.* (2012) power-flow diagrams show the fudged numbers

Figures 1 and B1 from Stephens *et al.* (2012), displaying the bad arithmetic and comparing it with the CMIP5 computer modeling.

L'Ecuyer *et al.* (2015) reanalyze the Ocean Heat Content (OHC) data and get different results and much larger error estimates than reported by Stephens *et al.* (2012)

- Following the Stephens *et al.* (2012) estimate of the Earth's power imbalance based on OHC data, L'Ecuyer *et al.* (2015) revise Loeb *et al.*'s (2009, 2012) ocean heat content data analysis.
- They correspondingly revise upwardly the (fudged) power imbalance error limits offered by Stephens *et al.* (2012). They do, however, provide their own "adjustments", that they instead call constraints.

	unconstrained	constrained
Incident ShortWave power (W/m^2)	+340.0 ± 0.5	+340.2 ± 0.1
Outgoing ShortWave power	-102 ± 4	-102 ± 4
Outgoing LongWave power	-238 ± 3	-238 ± 2
Net "observed" power imbalance	0 ± 5.0	0 ± 3.5
	(no warming)	(no warming)

The Observed State of the Energy Budget in the Early Twenty-First Century

TRISTAN S. L'ECUYER,[a] H. K. BEAUDOING,[b,c] M. RODELL,[b] W. OLSON,[d] B. LIN,[e] S. KATO,[e] C. A. CLAYSON,[f] E. WOOD,[g] J. SHEFFIELD,[g] R. ADLER,[c] G. HUFFMAN,[b] M. BOSILOVICH,[b] G. GU,[b] F. ROBERTSON,[h] P. R. HOUSER,[i] D. CHAMBERS,[j] J. S. FAMIGLIETTI,[k] E. FETZER,[k] W. T. LIU,[k] X. GAO,[l] C. A. SCHLOSSER,[l] E. CLARK,[m] D. P. LETTENMAIER,[m] AND K. HILBURN[n]

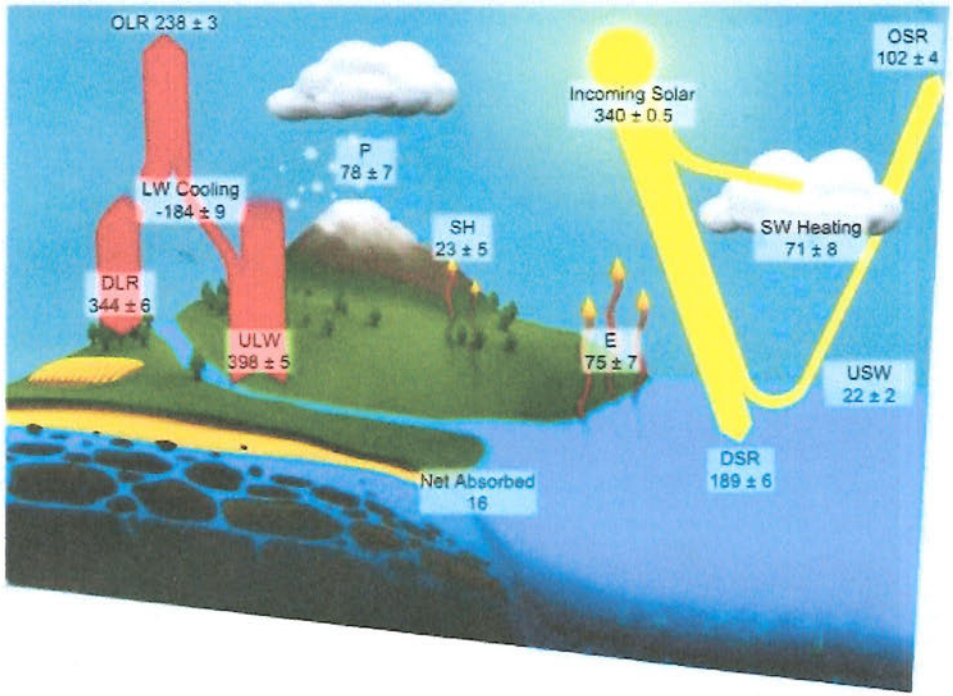


FIG. 1. The observed annual mean global energy budget of Earth over the period 2000–09 (fluxes in W m^{-2}). Note that each flux value corresponds to the aggregate from all surfaces around the globe. Longwave and shortwave fluxes are plotted over land and ocean regions, respectively, merely for convenience. The small fraction of DLR that is reflected by Earth's surface has been absorbed into the ULW.

Power flow diagram from L'Ecuyer *et al.* (2015, Fig.1.)

Critiques by Trenberth *et al.* (2010, 2014) - 1

- Satellites measure the Top of Atmosphere energy balance, while Ocean Heat Content data apply to the surface energy balance. One may legitimately mix power-flux data at the two different altitudes, if and only if one fully understands all of the power-flow processes in the atmosphere that occur between the surface and the Top of Atmosphere. If the latter requirement is not true, then one ends up with an "apples to oranges" comparison.
- Trenberth *et al.* (2010, 2014) are highly critical of Loeb, Stephens, L'Ecuyer, and Hansen's claimed "understanding" of the associated connection between the power flows at these two altitudes.
- Trenberth and Fasullo (2010) point to a <u>huge</u> "missing energy" indicated by the difference between the satellite data and the OHC data power-imbalance calculations, and specifically ask "*Where exactly does the energy go?*"

Critiques by Trenberth *et al.* (2010, 2014) - 2

- Hansen *et al.* (2011) dismiss Trenberth and Fasullo's alleged missing energy as being simply due to satellite calibration errors.
- Trenberth Fasullo and Balmesada (2014) further note that despite various considerations of the surface power balance, significant unresolved discrepancies remain, and they are skeptical of the power imbalance claims.
- In effect, Trenberth *et al.* are the earliest "whistle blowers" to the above-mentioned data fudges.

Stephens and L'Ecuyer (2015) together offer a *mea culpa* admission to having made an "unjustified, ad hoc" choice between OHC data and CERES satellite data, and miraculously now claim simultaneously both zero and +0.6 +/- 0.4 W/m^2 power imbalance.

- In response to criticism by Trenberth *et al.* (2010, 2014), Stephens and L'Ecuyer (2015) together offer what amounts to a *mea culpa* article regarding the aforementioned data fudging. They admit that "adjustments" do need to be made to obtain agreement (closure) between satellite data and ocean heat content data, and that these "adjustments" are very much larger (by about 10 W/m^2) than their claimed power imbalance, +0.6 +/- 0.4 W/m^2.
- Stephens and L'Ecuyer (2015) also admit that their choice of which data needs "adjustment" was made "*in a totally ad hoc*" fashion, and that "*there is no real evidence to support one adjustment approach over the other*".
- Amazingly, Stephens and L'Ecuyer (2015) persist in reporting (in their abstract line 5) the power imbalance = 0.6 +/- 0.4 W/m^2. (The infamous Loeb *et al.* (2012) global-warming BAD penny reappears again!).

	OHC	CERES (satellites)
Incident ShortWave power (W/m^2)	+340.0 ± 0.1	+340.0 ± 0.1
Outgoing ShortWave power	-102 ± 4	-100 ± 4
Outgoing LongWave power	-238 ± 4	-240 ± 4
Power imbalance reported (abstract line 5)	+0.6 +/- 0.4 W/m^2	(= warming)
Net "calculated" power imbalances (jfc)	0 ± 5.6 (no warming)	0 ± 5.6 (no warming)

Power imbalance analysis by Wild *et al.* (2019) and AR6 (2021) – imbalance and error bars fudged - 1.

- Wild *et al.* (2019) report new Clear sky (cloud-free-sky) measurements to the data set using ground sunlight observations via the Baseline Surface Radiation Network (BSRN).
- Wild *et al.* (2019)'s observational data claim an albedo for cloudy skies that is inconsistent with direct measurements by a factor of two, and/or significantly violates conservation of energy. (See energy conservation theorem Part II and Appendices A,B.) Their data require a cloudy-sky albedo ≈ 0.36, while direct measurements indicate a value ≈ 0.8.
- The Wild *et al.* (2019)'s diagram is copied directly by AR6 (2021), except for added fudges. The power fluxes and error bounds presented here are copied directly from the top lines of their nearly identical power-flow diagrams. The fudged power imbalances are copied directly from the associated lower left-hand corners.

Power imbalance analysis by Wild *et al.* (2019) and AR6 (2021) – imbalance and error bars fudged - 2.

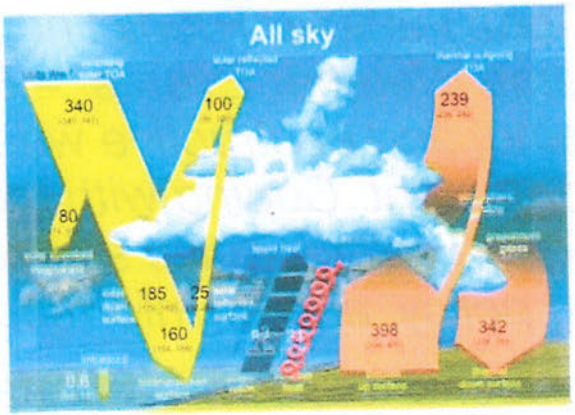
	Wild *et al.* (2019)	AR6 (2021)
Incident ShortWave power (W/m^2) see note**	+340.5 ± 0.5	+340.5 ± 0.5
Outgoing ShortWave power	-98 ± 2	-98.5 ± 1.5
Outgoing LongWave power	-239 ± 3	-239.5 ± 2.5
Power imbalance reported at bottom (lower left hand corner of Figures)	+0.6 +/- 0.4 (warming)	+0.7 ± 0.2 (strong warming)
Net "calculated" power imbalance (jfc)	3.5 ± 3.6 (no warming)	2.5 ± 3.0 (no warming)

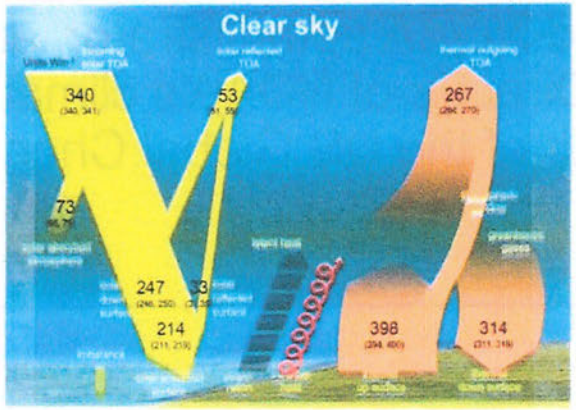
- The infamous Loeb *et al.* (2012) global-warming BAD PENNY reappears once again in Wild *et al.*(2019).

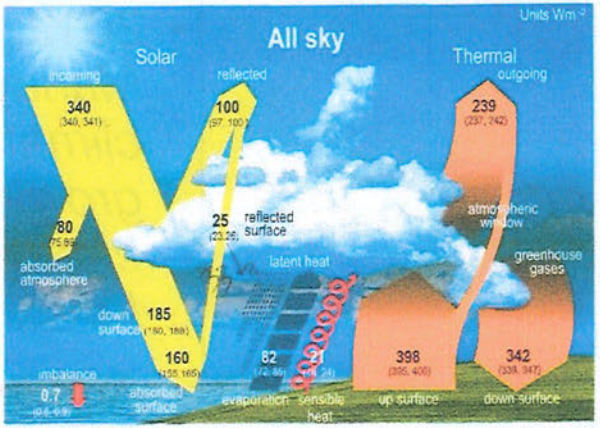
Power imbalance analysis by Wild *et al.* (2019) and AR6 (2021) – imbalance and error bars fudged - 3.

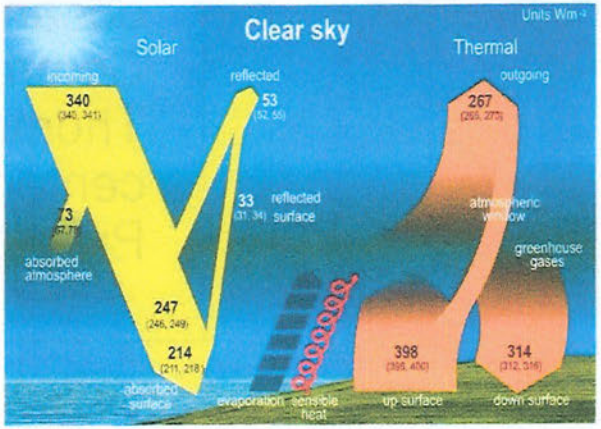
- The arithmetically incorrect **fudged** numbers shown in red are the values reported at bottom of their power flow diagrams. My last line gives the correct summation.
- Wild *et al.* (2019) introduce an innovative technique for data fudging: The Incident ShortWave power reported by previous power-flow maps (e.g. by Stephens and L'Ecuyer (2015), is typically 340.0 ± 0.1 W/m^2. Wild et al. (2019) and AR6 (2021) assume 340.0 ± 0.5 W/m^2, round upwardly the center of their asymmetric error-limit range by +0.5 W/m^2, and show both limits correspondingly rounded (upwardly) to the nearest whole number, as per 340 (340, 341) W/m^2. Note that their upward rounding amount, +0.5 W/m^2, similarly shifts upwardly their calculated power imbalance by almost all of their reported net power imbalances, +0.6 +/- 0.4 and +0.7 ± 0.2.

Wild (2019, left pair) & AR6 (2021, p.934), right pair) power-flow diagrams.









NOAA's scientific disinformation hoax asserting that the frequency of extreme weather events is increasing

Predicting and managing extreme weather events

Jane Lubchenco and Thomas R. Karl

Earth's climate is warming, and destructive weather is growing more prevalent. Coping with the changes will require collaborative science, forward-thinking policy, and an informed public.

This is a challenging time for the US and for US science. The economy, though it is beginning to show some positive signs, is still in bad shape. Extraordinary numbers of Americans are without jobs. The public holds a record-low opinion of government. The integrity of the scientific process is being questioned, and pressure to reduce federal spending is fierce.

The irony is that the demand for services provided by agencies such as the National Oceanic and Atmospheric Administration is at an all-time high and growing. Our ability to deliver those services depends in part on our scientific enterprise. One significant reason why demand for services is growing is the increased frequency and intensity of extreme weather events. Last year, new records were set in the US for tornadoes, drought, wind, floods, and wildfires. Heat records were set in every state. At one time last summer, nearly half of the country's population was under a heat advisory or heat warning. In late November, hurricane-force winds hit parts of Wyoming, Utah, Nevada, Arizona, New Mexico, and California, with winds reaching 97 mph in Pasadena.

We at NOAA were able to predict most of the weather- and climate-related extreme events, but our capacity to continue to do so is seriously threatened by downward pressure on our budgets. Budgets and politics threaten NOAA's ability to observe and model weather and climate events and to deliver information to the public. NOAA's abilities to fund and conduct research aimed at understanding the causes of extreme weather and to improve the effectiveness at response to our warnings are all at great risk.

This article focuses on the unusual weather and climate patterns we've documented in 2011 and in previous decades and identifies several actions that would help us to better predict and manage them. Succeeding in this tough environment will take innovative new approaches, a collaborative effort from the scientific community, and a broader appreciation for what is at risk.

Going to extremes

The number of events that produced on the order of $1 billion or more in damages in 2011 is the largest since tracking of that statistic began in 1980, even after damages are adjusted for inflation. NOAA estimates that there were at least 14 such events in 2011. (The previous record was nine, set in 2008; an average year would see three or four.) Collectively, the 14 events resulted in approximately $55 billion in damages. Furthermore, many events produced less than $1 billion in damage, but are not included in the tally, although they collectively represent additional significant financial losses. Why did we see such expensive damage last year? There are likely a number of contributing factors, including upward trends in population and infrastructure, migration to vulnerable areas, and climate change. The contribution of each of these factors remains an important research issue.

Of course, the economic losses are far from the full picture. Weather- and climate-related disasters in the US claimed more than 1000 lives in 2011, almost double the yearly average. For the victims, each of the events was a tragic tragedy. For our country, as for all countries, the events are an unprecedented challenge to the safety of our citizens, the bottom line for our businesses, and the smooth functioning of our society. Timely, accurate, and reliable weather warnings and forecasts are essential to our nation's ability to plan for, respond to, recover from, and prosper in the aftermath of disaster. Short-term forecasts are critical, but so are forecasts of slowly evolving events like prolonged droughts, snowand ice-melt flooding, and heat waves.

We've emphasized how unusual 2011 was, but was it an anomaly or part of a broader change? Should we expect more of the same in the future? Globally, according to the insurance company Munich Re, the number of extreme meteorological and hydrological events, defined in terms of economic and human impacts, has more than doubled over the past 20 years.

Jane Lubchenco is undersecretary for oceans and atmosphere at the US Department of Commerce and administrator of the National Oceanic and Atmospheric Administration. **Thomas Karl** is director of NOAA's National Climatic Data Center and chair of the US Global Change Research Program. This article is an edited version of the Union Agency Lecture given by Lubchenco at the 2011 fall meeting of the American Geophysical Union in San Francisco.

- 2012, Physics Today article "*Predicting and Managing Extreme Weather Events" – Earth's climate is warming, and destructive weather is growing more prevalent. Coping with the changes will require collaborative science, forward-thinking policy, and an informed public.*"
- Authors: Jane Lubchenco, undersecretary for oceans and atmosphere at the US Dept. of Commerce, and NOAA administrator, and Thomas Karl, Director of NOAA's climatic data center and chair of the US Global Change Program.

NOAA's disinformation hoax regarding an impending climate apocalypse

- The article asserts that there is an increase in the extreme weather event frequency that is associated with climate change in the three decades ending in 2012.
- The article presents data in their Fig. 2a displaying NOAA's Weather and Climate Extremes Index. That index is NOAA's numerical composite measure of the frequency of so-called extreme weather events, including hot-spells, cold-spells, droughts, floods, land-falling hurricanes, etc. (EF3+ tornado frequency is conspicuously absent from the list, presumably because it was actually decreasing. See Koonin, pp.124-125)
- The authors assert that their climate extremes index has "obviously" grown steadily over the last three decades. I assert here that their own data in their Fig. 2a disprove their own assertion.

Lubchenco and Karl's Fig. 2a

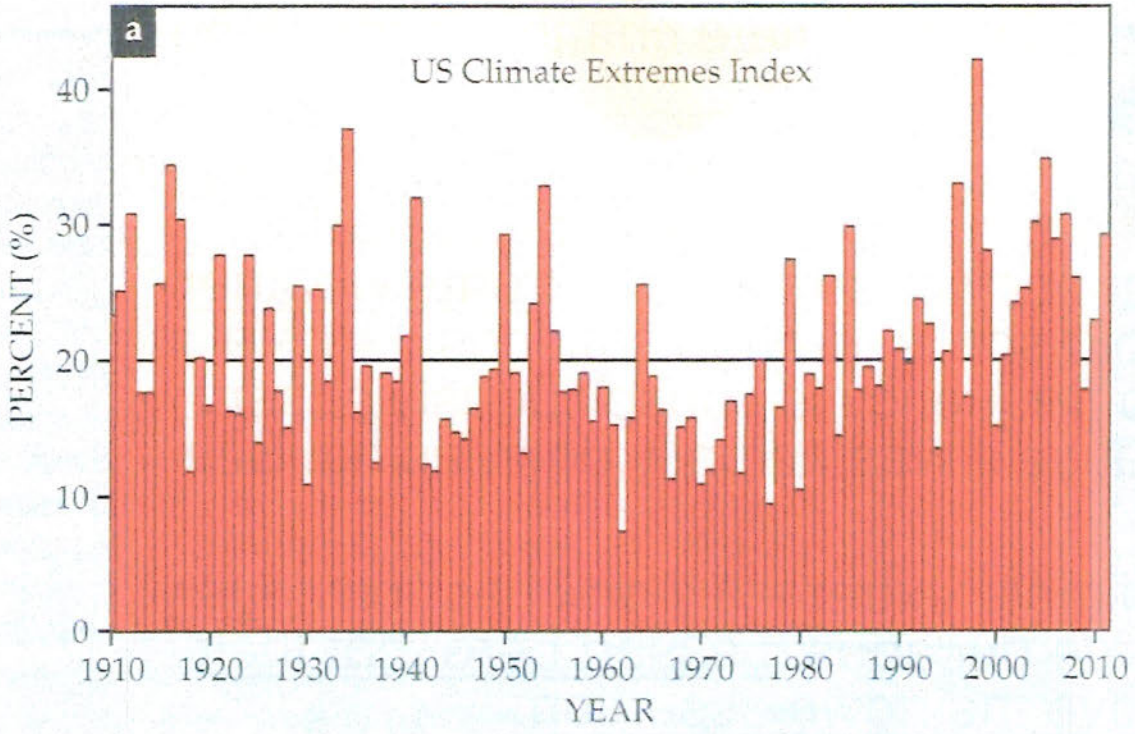
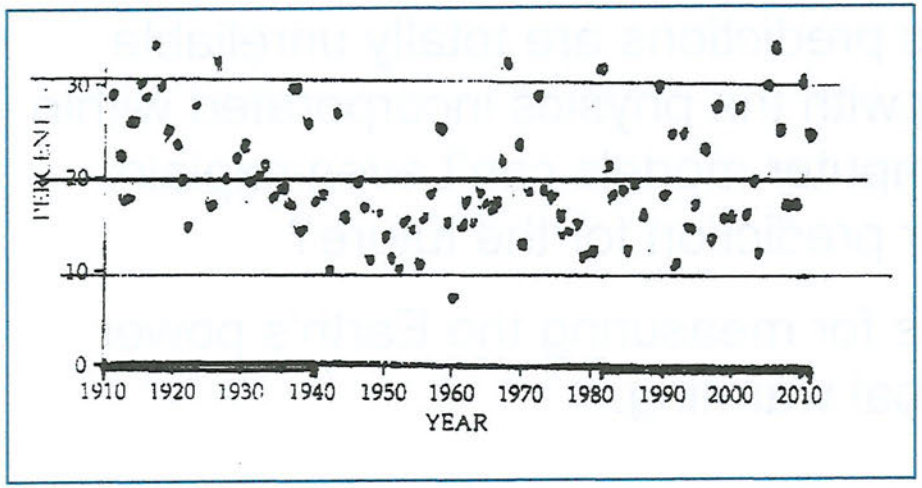
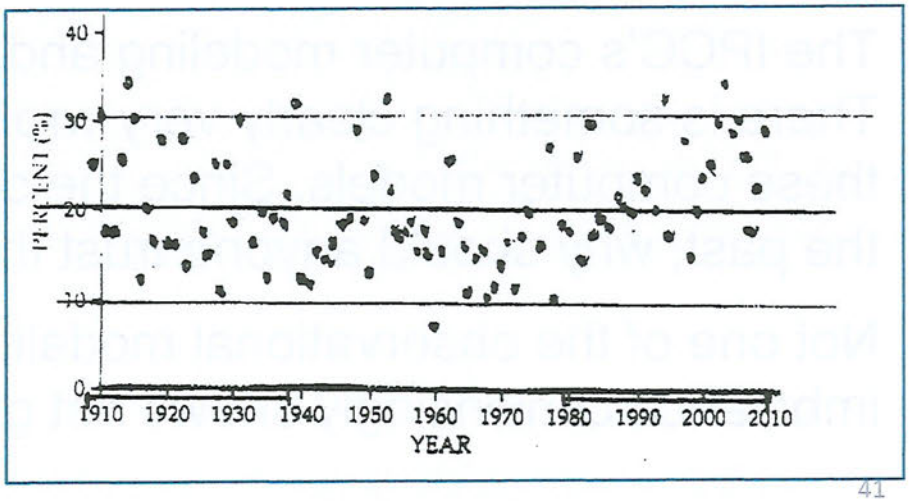


Figure 2. Weather and climate extremes. **(a)** The US Climate Extremes Index shows that, collectively, the area percentage of the country experiencing extreme monthly temperature, drought severity, soil water surplus, days with and without precipitation, land-falling hurricane activity, and one-day heavy precipitation events in any given year has grown steadily over the past several decades. (Extremes are defined as monthly averages that rank in the top or bottom 10th percentile of all data on record.) The black line is the average from 1910 to 2011. **(b–e)** The area percentages of the country experiencing extremes in selected indicators.

The two graphs below are traced directly from Fig. 2a. They are identical, except that one is plotted left-to-right reversed, i.e. backwards with time increasing to the left. If you look carefully, you will see that they are mirror images. If you can't tell which one of these graphs is correctly plotted and matches the one on the previous slide, and which one is time-backwards, I assert that their claimed recent increase in extreme weather-event frequency is not obviously indicated by their data, as they claim. Their claim is false! Are you really confidently willing to bet trillions of dollars that you can tell which one is correct? These data portend the impending apocalypse, so Lubchenko and Karl claim.





Part I – Conclusions - 1

1. The IPCC and its contributors claim the Earth has a net-warming energy imbalance. I show here that those claims are false.
2. The IPCC bases its claims on computer modeling of the Earth's atmosphere, and on observational data from a variety of observational modalities. Both the computer models and the observational data are grossly flawed, and fudged.
3. The IPCC's computer modeling and its predictions are totally unreliable. There is something clearly very wrong with the physics incorporated within these computer models. Since the computer models can't even explain the past, why should anyone trust their prediction for the future?
4. Not one of the observational modalities for measuring the Earth's power imbalance convincingly shows net global warming.

Part I – Conclusions - 2

5. I show where various observers and the IPCC have dishonestly fudged their reported data, and have dishonestly changed it from showing No Warming, to showing Warming. Crucially important data fudges are revealed here and highlighted in red. If you don't believe me, check my arithmetic.
6. The IPCC and NOAA further claim that the purported power imbalance has already caused an increase in dangerous extreme weather events. NOAA's own data disprove their own claims.
7. **I thus offer Great News. Despite what you may have heard from the IPCC and others, there is no real climate crisis! The planet is NOT in peril!**
8. **The IPCC's (and NOAA's) claims are a hoax. Trillions of dollars are being wasted.**

Part II – The cloud thermostat - 1

1. So what is really happening? Why is the earth's climate actually as stable as it really is?
2. The cloud thermostat mechanism is clearly the overwhelmingly dominant climate controlling feedback mechanism that controls stabilizes the Earth's climate and temperature. It thereby prevents global warming and climate change.
3. The cloud-thermostat mechanism provides very powerful feedback that stabilizes the Earth's climate and temperature. It great strength obtains from the observed large fluctuation of the Earth's power imbalance.
4. The mechanism gains its strength from the Earth's observed very large cloud-cover variation. The power imbalance is actually observed to be continuously strongly fluctuating by anywhere between 18 to 55 W/m^2.

Part II – The cloud thermostat - 2

5. Clouds modulate the outgoing Shortwave power and therefore control the Earth's power imbalance, minimally with a 18 W/m^2 available power range (ignoring the added 18 W/m^2 solar-constant variation), which is minimally 26 times the IPCC's 0.7 W/m^2 claimed power imbalance, and 45 times the IPCC's ± 0.2 W/m^2 power imbalance error range.
6. The above numbers use the IPCC's assumed data parameters. With more realistic assumptions, the cloud-thermostat mechanism controls the Earth's power imbalance with a 73 W/m^2 available power range, which is 100 times bigger than the IPCC's 0.7 W/m^2 claimed power imbalance, and 180 times bigger than the IPCC's ± 0.2 W/m^2 power-imbalance total error range.

Part II – The cloud thermostat - 3

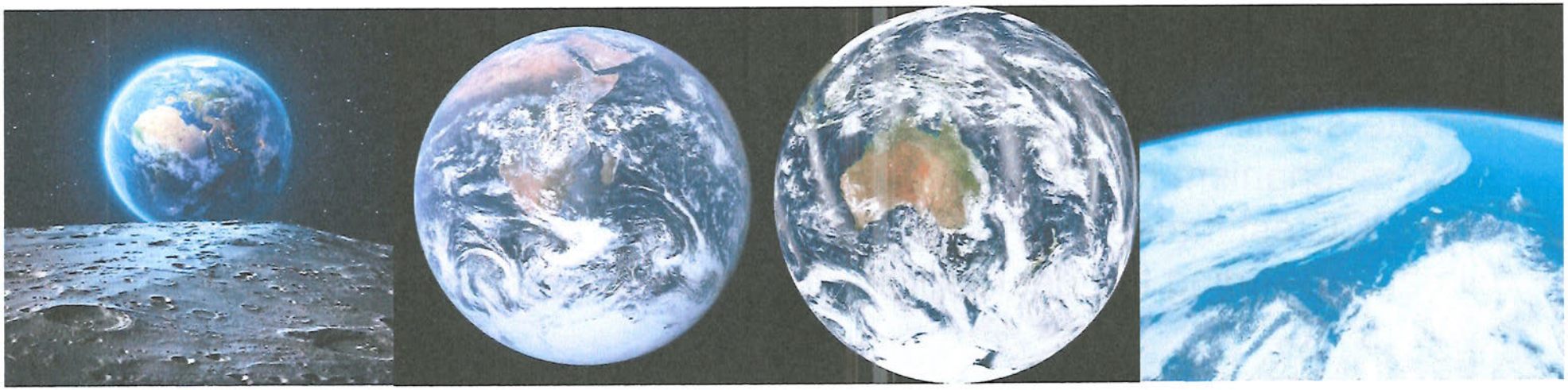
7. This seemingly random fluctuation of the power imbalance is not random at all, but is actually a crucial part of a thermostat-like feedback mechanism that controls and stabilizes the Earth's climate and temperature. It is observed by King *et al.* (2013) and by Stephens *et al.* (2015) to be quasi-periodic,
8. Just like the thermostat in your home, the power-imbalance is never zero. The furnace or AC is always either ON or OFF. The thermostat simply modulates the heating/cooling duty cycle.

Features of the cloud thermostat mechanism

1. In preparation for the introduction of this model, I first describe important, underappreciated, but conspicuous properties of clouds - their variability and their strong reflectivity of sunlight (SW radiation).
2. I show that the cloud-thermostat mechanism involves the dominant (73%) use of sunlight energy by the planet.
3. I show that when the cloud-thermostat mechanism is viewed as a form of climate-stabilizing negative feedback, it is by far the most powerful of any such mechanism heretofore considered.
4. The IPCC estimates that the net stabilizing feedback strength or the Earth's climate, including the destabilizing feedback strength of greenhouses is about -1 $W/m^2/ºC$.
5. I show that the cloud thermostat feedback increases the net natural stabilizing feedback strength to about anywhere between -7 $W/m^2/ºC$ and -14 $W/m^2/ºC$, depending on the assumptions used.

Some important properties of clouds

What does the Earth look like when viewed from space in sunlight?



There are 5 important take-home messages to be gleaned from these satellite photographs.

1. Clouds reflect dramatically more sunlight than the rest of the planet does!
2. Clouds of all types appear bright white!
3. The photos (along with a large number of careful measurements) strongly suggest that the average cloud reflectivity (of sunlight) is about 0.8 – 0.9. (For comparison, white paper has a reflectivity of ≈ 0.99.) [Wild *et al.* (2019) claim that cloud reflectivity is 0.36.]
4. The rest of the planet appears much darker than the clouds. The average reflectivity of land (green and brown areas) and ocean (dark blue areas) is ≈ 0.16.
5. Cloud coverage area is highly variable over the Earth.

Clouds cast dark shadows.

- Clouds cast dark sharply-defined shadows on the surface below them. Just stand on a hillside or look down from an airplane on a partly cloudy day and watch the cloud shadows cast on the land below.
- Watch your solar-panel output when a solitary cloud passes in front of the sun. Typically, the output drops to 50% or less.
- Try reading a book indoors on a heavily overcast day without turning on the lights. You can't. It's too dark! Where did all of the missing sunlight go? Since water droplets negligibly absorb sunlight, the missing sunlight (typically 80-90% of it) got reflected back out into space.

What does sunlight mostly do when it reaches the Earth's surface?

- It is commonly believed that sunlight that is absorbed by the Earth's surface simply warms the surface. That may be true over land. But land represents only about 30% of the surface.
- Oceans cover 70% of the Earth's surface. Correspondingly, about 70% of incoming sunlight falls on the oceans. Virtually all of the Earth's exposed water surface occurs in the oceans.
- Following the AR6 power-flow diagram, 160 W/m^2 is absorbed by the whole Earth, meaning that roughly 70% X 160 = 112 W/m^2 is absorbed by oceans.
- The AR6 power-flow diagram indicates that 82 W/m^2 is used for evaporating water, and <u>not</u> for heating the surface.
- Since clouds are mostly produced over the oceans (because that's where the exposed water is), then 82/112 = <u>73% of the input energy absorbed by the Earth's oceans is used, not for warming the Earth, but instead simply for making clouds.</u>

Satellite observations of cloud-cover fraction by King *et al.* (2013) -1.

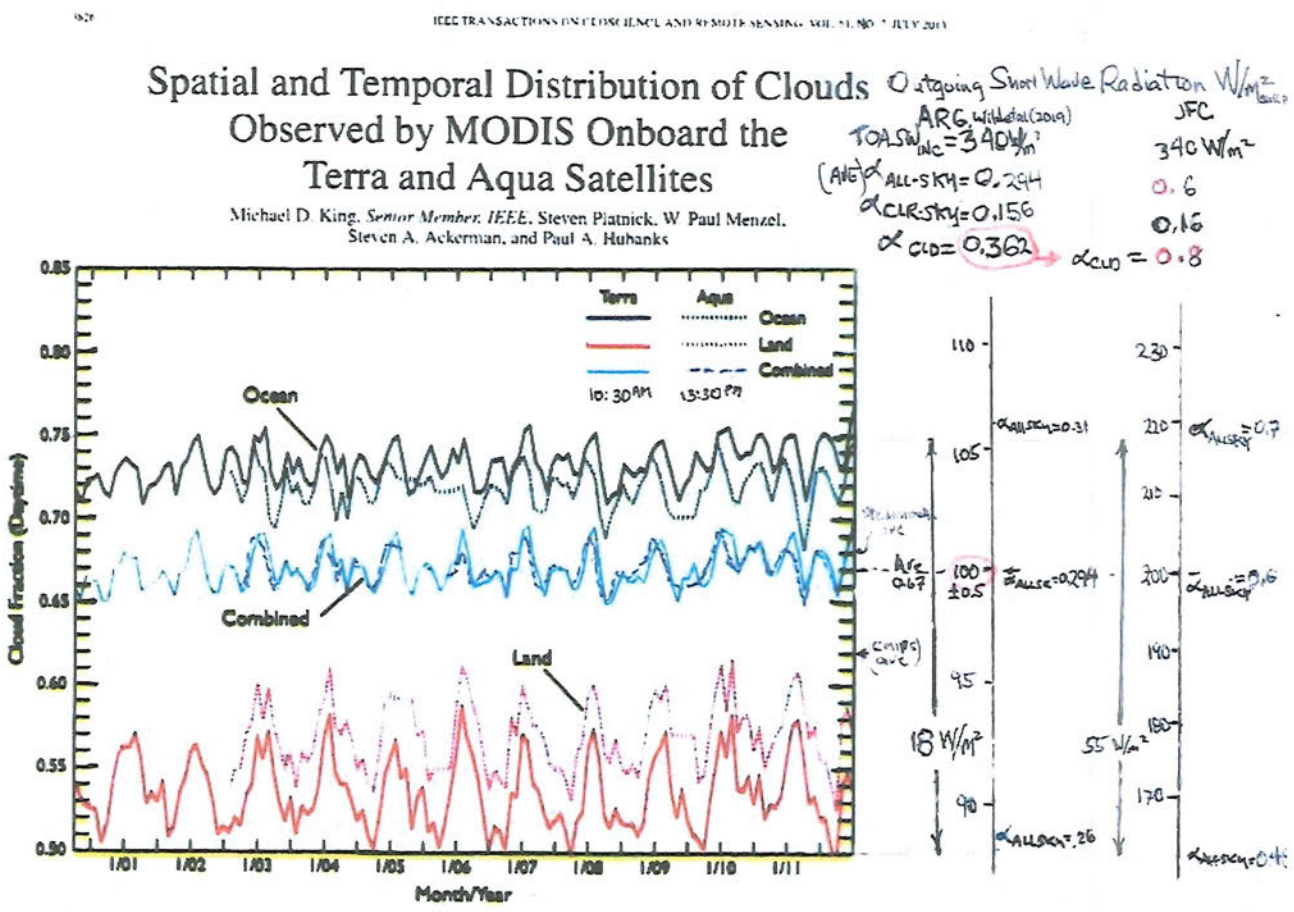


Fig. 5. Global mean daytime cloud fraction as a function of time for Terra and Aqua differentiated by surface type.

- King *et al.* (2013) analyzed more than 12 years of data from the CERES Terra and Aqua sun-synchronous satellites, and measured the daytime fractional cloud cover, over ocean, land, and combined.
- I have added Outgoing (reflected sunlight) SW power scales, assuming a constant solar input power, 340 W/m^2.

Satellite observations of cloud-cover fraction by King *et al.* (2013) -2.

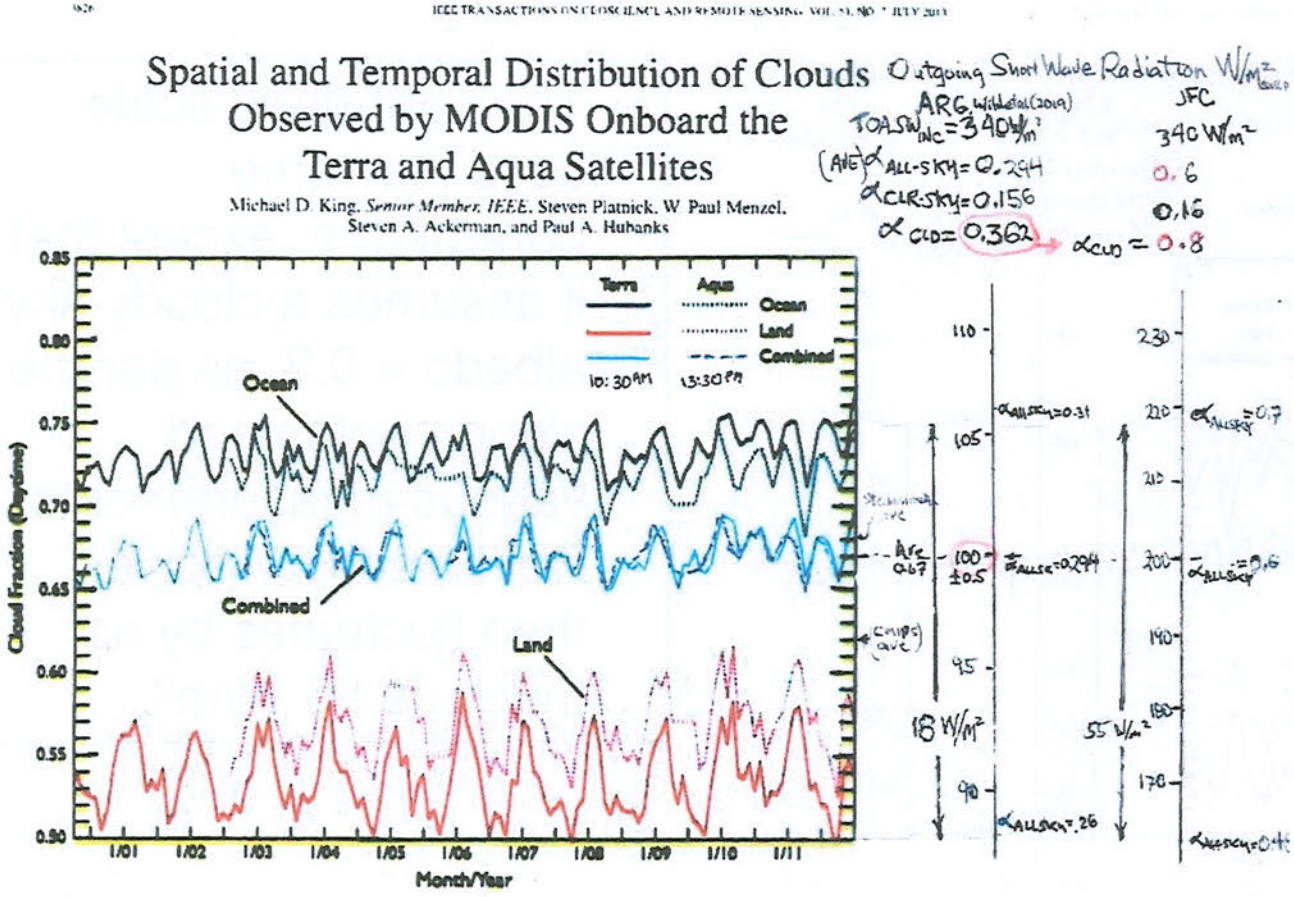


Fig. 5. Global mean daytime cloud fraction as a function of time for Terra and Aqua differentiated by surface type.

- The left-hand scale uses the parameters from the 2021 AR6 report. It assumes an all-sky albedo = 0.3, and a clear-sky albedo = 0.16. Energy conservation (see Appendix B) further requires a cloudy-sky reflectivity (albedo) = 0.36. (an unreasonable value). On this scale, reflected SW power fluctuates by as much as 18 W/m^2.

Satellite observations of cloud-cover fraction by King *et al.* (2013) -3.

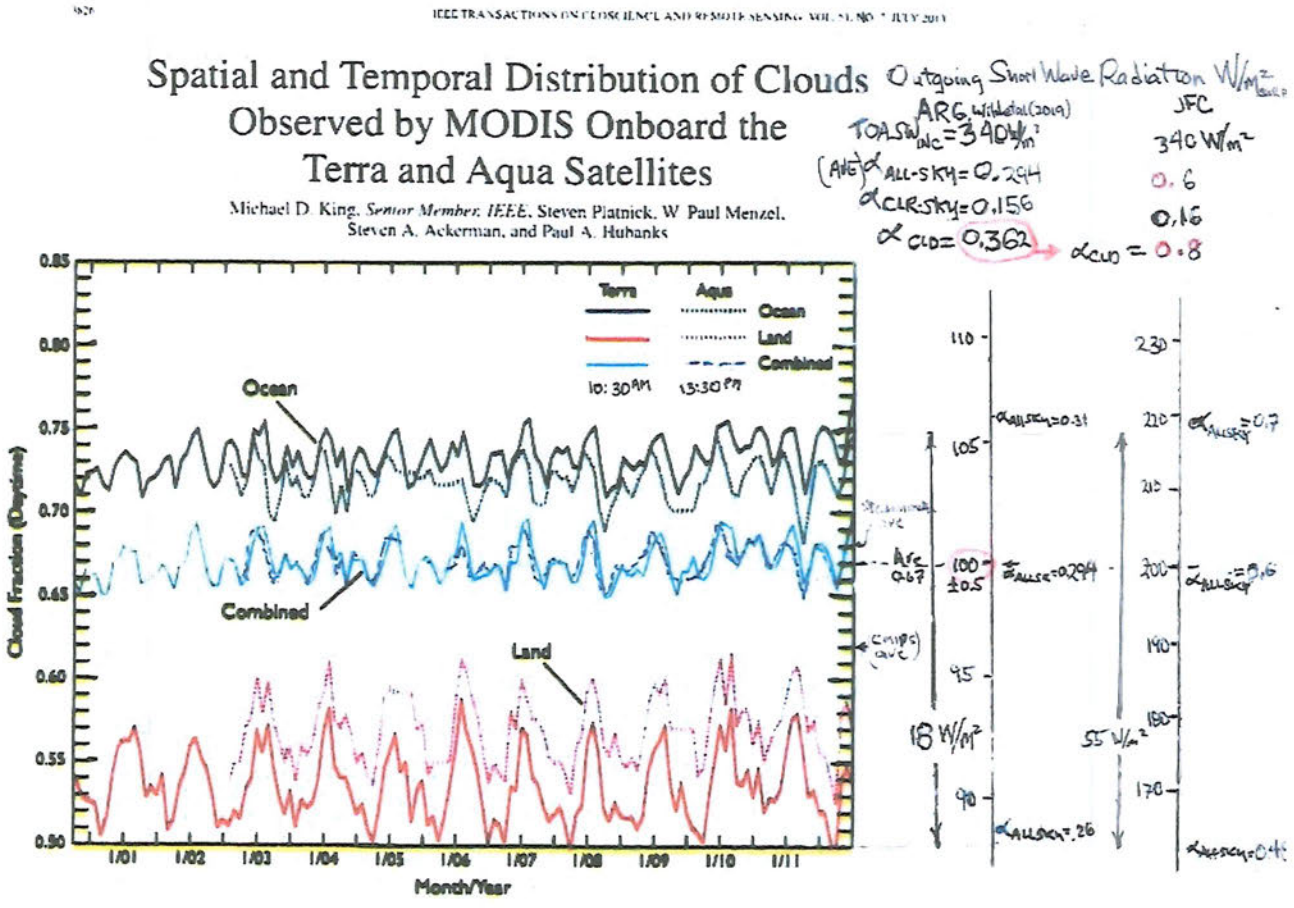


Fig. 5. Global mean daytime cloud fraction as a function of time for Terra and Aqua differentiated by surface type.

- The right-hand scale uses the same parameters, except that it assumes a cloudy-sky albedo = 0.8, as per the cloud photos and various measurements. Reflected SW power then fluctuates by as much as 55 W/m^2.

Satellite observations of cloud-cover fraction by King *et al.* (2013) -4.

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Spatial and Temporal Distribution of Clouds Observed by MODIS Onboard the Terra and Aqua Satellites

Michael D. King, *Senior Member, IEEE*, Steven Platnick, W. Paul Menzel, Steven A. Ackerman, and Paul A. Hubanks

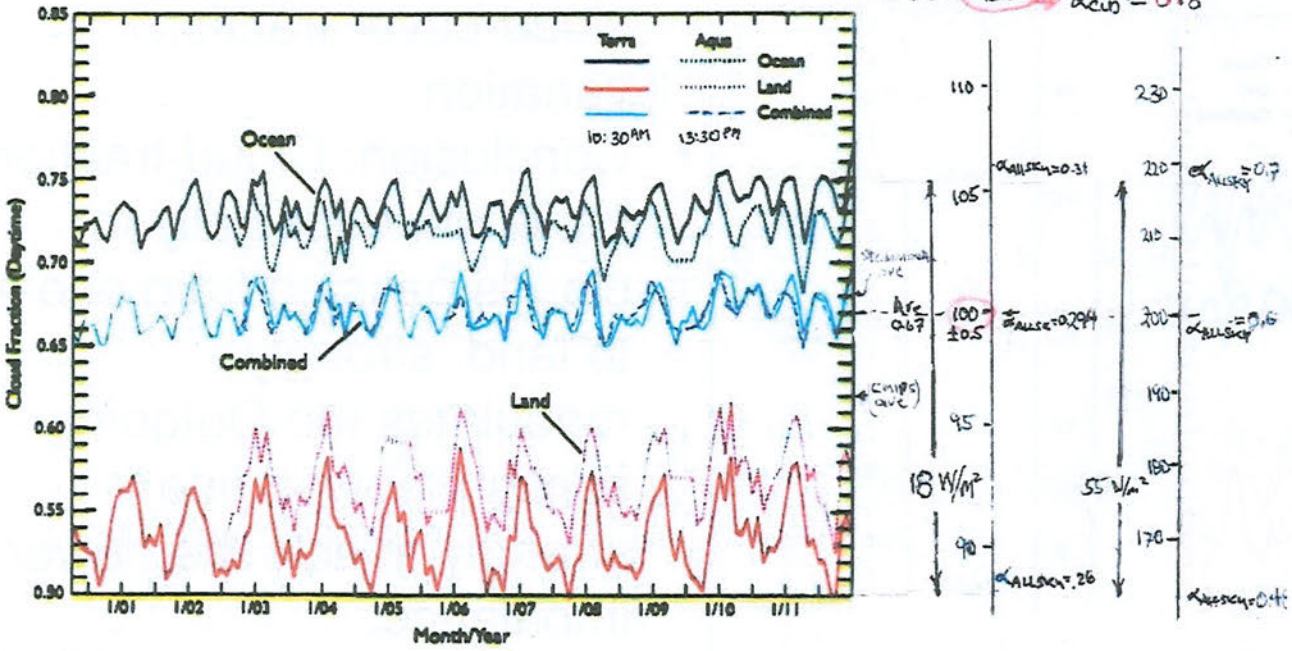


Fig. 5. Global mean daytime cloud fraction as a function of time for Terra and Aqua differentiated by surface type.

- The cloud-fraction variation is extremely strong and very rapid. The difference between the adjacent solid and dotted lines is the average everyday variation in only three hours – from 10:30AM to 13:30PM.
- Recall that the IPCC insists that the global average power imbalance is always precisely 0.7 ± 0.2 W/m^2.

Satellite observations of cloud-cover fraction by King *et al.* (2013) -5.

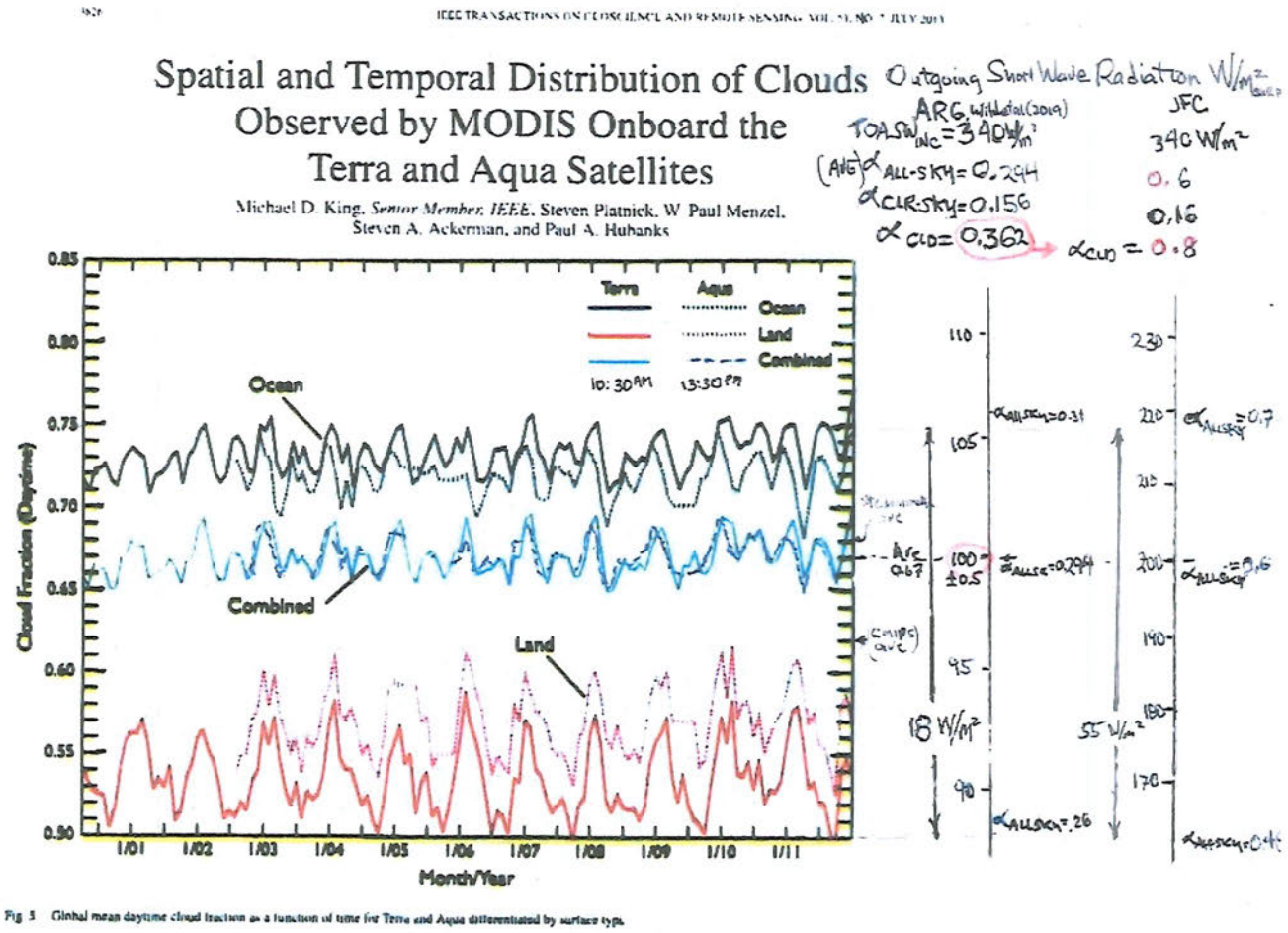


Fig. 5. Global mean daytime cloud fraction as a function of time for Terra and Aqua differentiated by surface type.

- The albedo fluctuation data presented by Stephens *et al.* (2015, see earlier slide), compared to this Figure, shows that the albedo fluctuation is due to cloud-cover fraction variation.
- Conclusion: Cloud-fraction variation, especially for clouds passing from ocean to land, strongly modulates the Outgoing sunlight power, and strongly affects the power imbalance.

My cloud thermostat model – how does it work-1?

1. Recall that the IPCC's AR6 power-flow map asserts that 73% of the input energy absorbed by the Earth's oceans is used, not for warming the Earth, but instead simply for evaporating seawater and making clouds, rather than for raising the Earth's surface temperature. Recall that the Earth has a strongly varying cloud cover and albedo.
2. Temperature control of the Earth's surface by this mechanism works exactly the same way as does a common home thermostat. A thermostat automatically corrects a structure's temperature in the presence of varying modest heat leaks. For the earth, the presence of significant CO_2 in the earth's atmosphere, manmade or not, provides, in fact, a very small heat leak (at most, about 2 W/m^2). Note that, just like the Earth, the power imbalance for a thermostatically controlled system is never zero. It is always fully heating or fully cooling.

My cloud thermostat model – how does it work-2?

3. How does the cloud thermostat work? When the Earth's cloud-cover fraction is too high, then the earth's surface temperature is too low. Why? Clouds produce shadows. Cloudy days are cooler than sunny days. A high cloud-cover fraction equals a highly shadowed area. With reduced sunlight reaching the ocean's surface and lower temperature, the evaporation rate of seawater is reduced. The cloud production rate over ocean (70% of the earth) is low because sunlight is needed to evaporate seawater. The earth's too-high cloud-cover fraction obediently starts to decrease. Very quickly, cloud-cover fraction decreases, the temperature increases. The Earth's cloud-cover fraction is no longer too high. Equilibrium cloud cover and temperature are restored.
4. When the Earth's cloud-cover fraction is too low, the surface temperature is then too high, then the reverse process occurs. With low cloud cover, lots of sunlight reaches the ocean surface. Increased sunlit area then evaporates more seawater. The cloud-production rate obediently increases and the cloud-cover fraction is no longer too low . Equilibrium cloud cover and temperature are again restored.

My cloud thermostat model – how does it work-3?

5. **Depending of one's assumption regarding cloud reflectivity (albedo), the cloud thermostat mechanism has anywhere between 18 and 55 W/m^2 power available from cloud-fraction variability to overcome a wimpy 0.7 W/m^2 heat leak (allegedly blamed on greenhouse gasses) and to stabilize the Earth's temperature, <u>no matter what the greenhouse gas atmospheric concentration is!</u>**
6. These two fluctuating opposing processes, when in equilibrium, provide an equilibrium cloud-cover fraction, and an equilibrium average temperature. The earth thus has a built in thermostat!

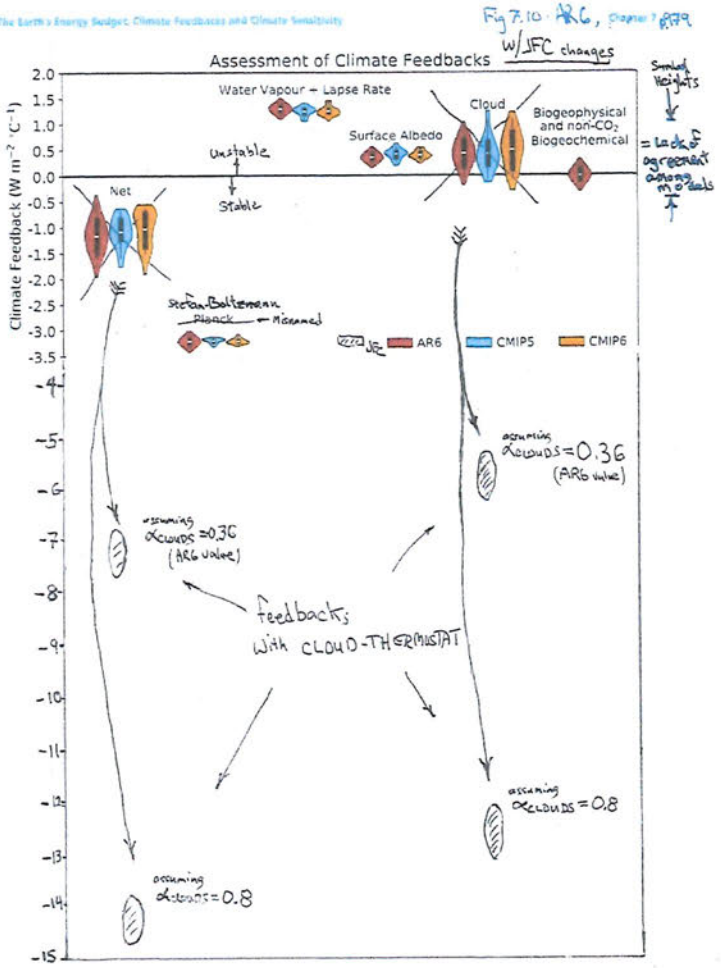
Analysis of atmospheric feedback systems

1. The IPCC's second sacred task was to estimate the so-called feedback stability of the Earth's atmosphere and its sensitivity to external perturbations, such as increased greenhouse gasses, volcanism, etc.
2. Given huge observed fluctuations in Outgoing power, the Earth obviously maintains a surprisingly stable long-term temperature. Why?
3. Climate scientists have proposed the existence of a variety of feedback mechanisms that account for the evident stability.
4. Climate feedback systems are discussed extensively by the 2003 National Research Council / National Academy report "*Understanding Climate Change Feedbacks*", by Sherwood *et al.* (2020 – the Ringsberg Castle study), and by AR6 (2021, Chapter 7.4).
5. The detailed calculation methodology used by Sherwood *et al.* (2020) is outlined in Appendix C.
6. By removing one of Sherwood *et al.* (2020)'s overly restrictive assumptions, their methodology becomes applicable to the cloud thermostat mechanism, as is shown in Appendix D.

Feedback strength of the cloud thermostat mechanism

1. The resulting cloud-thermostat mechanism's feedback parameter is now readily evaluated under the two scenarios associated with two choices for cloud albedo. The details of the calculation are shown in Appendix D.
2. Using the AR6 choice for cloud albedo, $\alpha_{Clouds} = 0.36$, we have $\lambda_{Clouds} \approx -5.7$ W/m^2 K, which 1.7 times larger than (the misnamed) λ_{Planck} , heretofore the strongest feedback term.
3. Alternatively, using the more reasonable choice for cloud albedo, $\alpha_{Clouds} = 0.8$, we have $\lambda_{Clouds} \approx -12.7$ W/m^2 K, which is 3.8 times larger than (the misnamed) λ_{Planck}.
4. These values are plotted as an extension of the AR6 Figure 7.1, which shows the feedback strength for various mechanisms. The total system strength is shown in the left-hand column.
5. Viewed as a temperature-control feedback mechanism, <u>in either scenario</u>, the cloud thermostat has the strongest negative (stabilizing) feedback of any mechanism heretofore considered.
6. It very powerfully controls and stabilizes the Earth's climate and temperature.

Comparative feedback sensitivities for various mechanisms.



- AR6 (2021, Fig. 7.10, p. 979) estimates for the so-called feedback strengths (sensitivities) for various mechanisms.
- The AR6 Figure is corrected by replacing their estimate of λ_{Clouds} , with the estimates calculated here for the cloud-feedback mechanism, under two scenarios - assuming cloud albedo = 0.36, and 0.8. In both scenarios, the cloud-feedback mechanism is dominant. [See Appendix D]

Part II - Conclusions

1. I have introduced here the cloud-thermostat mechanism. It is clearly the overwhelmingly dominant climate controlling feedback mechanism that controls stabilizes the Earth's climate and temperature. It thereby prevents global warming and climate change.
2. The IPCC's 2021 AR6 report (p.978) claims that climate stabilizing natural feedback mechanisms have a net (total) stabilizing strength of -1.16 ± 0.6 $W/m^2/K$. My cloud feedback mechanism has a net stabilizing strength of anywhere between -5.7 to -12.7 $W/m^2/K$, depending of one's assumptions regarding the albedo of clouds.
3. My cloud thermostat mechanism provides nature's own *Solar Radiation Management System*. This mechanism already exists. It is built in to nature's own cloud factory. It works very well to stabilize the Earth's temperature on a long term basis. And, it is free!

"Recommendations for policy makers - 1"

1. There is no climate crisis! There is, however, a very real problem with providing a decent standard of living to the world's now enormous population. There is indeed an energy shortage crisis. The latter is being unnecessarily exacerbated by what, in my opinion, is incorrect climate science, and by government's associated incorrect muddled response to it.
2. Government and business are currently <u>needlessly</u> spending trillions of dollars on efforts to limit the greenhouse gasses, CO_2 and CH_4, in the Earth's atmosphere.
3. <u>CO_2 and CH_4 are not pollutants</u>. They must be removed from every list of defined pollutants. They have a negligible effect on the climate. Trillions of dollars can be saved by this one simple measure alone! Additionally, the CO_2 Coalition points out that atmospheric CO_2 is actually beneficial.

"Recommendations for policy makers - 2"

4. I recommend that all efforts to limit environmental carbon should be terminated immediately! Trillions of dollars can be saved by eliminating carbon caps, carbon credits, carbon sequestration, carbon footprints, zero-carbon targets, carbon taxes, anti-carbon policies and fossil-fuel limits, in energy policy and elsewhere.
5. Government requirements and subsidies for electric vehicles, all electric power, solar and wind power, etc. should all be eliminated.
6. Geoengineering programs to reduce global warming should be cancelled.
7. To paraphrase (and update for inflation) the late Sen. Everett Dirksen's 1969 comment about the Vietnam war and Apollo programs, and redirect it to the IPCC's anti-carbon policies - "*A* trillion *here, a* trillion *there, and pretty soon you're talking real money.*"

Appendix A. An energy-conservation Theorem phrased in terms of albedos

Theorem: The albedo of a composite area is the area-weighted average of the individual component areas' albedos -

$$\alpha_{ALL\text{-}sky} = f_{Clouds} \times \alpha_{Clouds} + f_{CLR\text{-}sky} \times \alpha_{CLR\text{-}sky}$$

Definitions:

$OSR_{ALL\text{-}sky} \equiv$ Outgoing SW Radiation irradiance for the whole Earth.

$OSR_{CLR\text{-}sky} \equiv$ Outgoing SW Radiation irradiance in cloud-free areas of the Earth.

$OSR_{Clouds} \equiv$ Outgoing SW Radiation irradiance in cloudy areas of the Earth.

$TOA_{INC} \equiv$ Incident SW Radiation irradiance for the whole Earth.

$f_{Clouds} \equiv$ cloudy-area fraction of the Earth.

$f_{CLR\text{-}sky} \equiv$ cloud-free area fraction of the Earth.

$\alpha_{ALL\text{-}sky} \equiv OSR_{ALL\text{-}sky} / TOA_{INC}$ = albedo (SW reflectivity) for the whole Earth.

$\alpha_{CLR\text{-}sky} \equiv OSR_{CLR\text{-}sky} / TOA_{INC}$ = albedo for cloud-free areas of the Earth.

$\alpha_{Clouds} \equiv OSR_{Clouds} / TOA_{INC}$ = albedo for cloudy areas of the Earth.

Assumtions:

Conservation of area: $f_{Clouds} + f_{CLR\text{-}sky} = 1.$ (1)

Conservation of energy, $OSR_{ALL\text{-}sky} = OSR_{CLR\text{-}sky} + OSR_{Clouds}.$ (2)

Proof:

Evaluate the above expressions, using Equations (1) and (2) for $\alpha_{ALL\text{-}sky}$, α_{Clouds}, and $\alpha_{CLR\text{-}sky}$,

$$\alpha_{ALL\text{-}sky} = f_{Clouds} \, X \, \alpha_{Clouds} + f_{CLR\text{-}sky} \, X \, \alpha_{CLR\text{-}sky}, \qquad (3)$$

Corollary:

$$\alpha_{Clouds} = \alpha_{ALL\text{-}sky} / f_{Clouds} - ((1/ f_{Clouds}) - 1) \, \alpha_{CLR\text{-}sky} \qquad (4)$$

This latter formula is useful for evaluating the cloudy-sky albedo when ALL-sky albedo, CLR-sky albedo, and cloud fraction are all known.

Appendix B. Application of the albedo conservation Theorem to data from the Fig. X.6 AR6 (2021 p.934) power-flow map data

The IPCC's numbers from AR6 are shown here to require the silly number, $\alpha_{Clouds} = 0.36$. (The notation used here is defined above in Appendix A.)

First note that the AR6 all-sky diagram implies that the all-sky albedo is

$$\alpha_{ALL\text{-}sky} \equiv OSR_{ALL\text{-}sky} / TOA_{INC} = 100 / 340 = 0.3.$$

The clear-sky diagram (lower power flow map), for $f_{CLR\text{-}sky} = 0.33$ (i.e. for 33% of the Earth's area), simultaneously implies that the clear-sky albedo is

$$\alpha_{CLR\text{-}sky} \equiv OSR_{CLR\text{-}sky} / TOA_{INC} = 53 / 340 = 0.16.$$

For the cloud fraction, $f_{Clouds} = 0.67$, the albedo conservation corollary (in Appendix A) shows that the cloudy sky albedo is $\alpha_{Clouds} = 0.36$.

This value for α_{Clouds} seems conspicuously wrong by about a factor of two! If true, then clouds in the NASA satellite photos of Fig. X.7 should appear as barely brighter (more reflective of light) than the whole-Earth average. They don't. For comparison, a sheet of white paper is about 99% reflective. Clouds in the photos appear visually a lot brighter than dessert-color brown or ocean-color blue, and appear much closer to paper-color white,.

Also, note that the commonly accepted value for nearly all types of clouds is about $\alpha_{Clouds} = 0.8$ - 0.9. See, for example, the measurements and estimates by Griggs (1968), Cheylek et al. (1984), Wetherald and Manabe (1988), Stephens and Greenwald (1991). The measurements of αClouds for Pacific Ocean stratus clouds by Griggs (1968) were done from a DC3 aircraft, and, of course, do not include the added contribution from atmospheric (blue-sky) Rayleigh (back) scattering, that Top of Atmosphere albedos αClouds and αCLR-sky must both further add.

Appendix C. Feedback Analysis of climate systems [as per Sherwood *et al.* (2020)]

- Sherwood *et al.* (2020) use the symbol $\Delta\mathcal{N}$, to represent the **downward-flowing energy imbalance**, calculated at the Top of Atmosphere. This is the quantity the I have discussed above that is used by the IPCC to define global warming. It is the primary target of the IPCC's computer modelling and observational efforts.
- If the imbalance, $\Delta\mathcal{N}$, is negative, the earth is cooling. If it is positive, the Earth is warming.
- For any given feedback mechanism, Sherwood *et al.* (2020) calculate the overall feedback strength (sensitivity) as the derivative of $\Delta\mathcal{N}$ with respect to the Earth's surface temperature,

  $$\lambda \equiv d\Delta\mathcal{N} / dT_{Surface}.$$

  If λ is negative, the feedback stabilizes the system. If , if λ is positive, the system is unstable.
- If the system has a variety of independent mechanisms, and each mechanism, labeled j, relies on an associated intermediate variable, x_j , then the total system's feedback strength is calculated using the chain rule for derivatives, as per

  $$\lambda \equiv \Sigma_j \lambda_j = \Sigma_j (\partial\Delta\mathcal{N} / \partial x_j) \text{ X } (\partial x_j / \partial T_{Surface}).$$
- For example, the primary temperature stabilizing feedback mechanism is via the Stefan-Boltzmann law's σT^4 dependence of far-infrared (LW) energy reemission by the Earth. Here, σ, is the Stephan-Boltzmann constant. Sherwood *et al.* (2020, p.19) calculate the (misnamed) feedback parameter, λ_{Planck}, for Stefan-Boltzmann law negative feedback, as $\lambda_{Planck} = -3.3$ W/m^2/K.

(The Stefan-Boltzmann Law was discovered in 1879. Planck's law was not discovered until 1900. The quantity called λ_{Planck} should properly be called $\lambda_{Stefan\text{-}Boltzmann}$.)

Appendix D. Feedback strength of the cloud thermostat mechanism

- To calculate the feedback strength for the cloud thermostat, note that the shadowing of the oceans by clouds modulates the sunlight irradiance reaching the surface, SW_{down}. In doing so, it similarly modulates $\Delta\mathcal{N}$. A first step in the calculation is to use the albedo conservation theorem, and the terminology introduced in Appendix A, to evaluate SW_{down} , as per

$$SW_{down} \equiv (1-\alpha_{ALL\text{-}sky})\ TOA_{INC}$$
$$= [1-(f_{Clouds}\ \alpha_{Clouds} + f_{CLR\text{-}sky}\ \alpha_{CLR\text{-}sky})]\ TOA_{INC},$$

  where TOA_{INC} is the incident sunlight power.

- For some strange reason, Sherwood *et al.* (2020) arbitrarily structure the allowable forms for $\Delta\mathcal{N}$ to prohibit the use of f_{Clouds} as an intermediate variable x_{Clouds} . I ignore this silly restriction here! [Cess (1976) did use use f_{Clouds} as an intermediate variable and obtained similar results to those presented here.]

- The climate feedback parameter for the specific cloud thermostat process is

$$\lambda_{Clouds} \equiv d\ SW_{down} / dT_{surface}\ .$$

It may be expanded using the chain rule, and f_{Clouds} as an intermediate variable, yielding

$$\lambda_{Clouds} = d\ SW_{down} / dT_{surface} = (\partial\ SW_{down} / \partial\ f_{Clouds})\ X\ (\partial\ SW_{down} / \partial T_{surface})$$
$$= -\ (f_{Clouds}\ \alpha_{Clouds})\ TOA_{INC}\ (\partial\ f_{Clouds} / \partial T_{surface}).$$

- Finally one may reasonably estimate the remaining important factor, $\partial f_{Clouds} / \partial T_{surface}$. It is found by noting that both the precipitation rate of clouds and the evaporation rate are a sensitive functions of surface temperature. Both are *directly proportional to the vapor pressure of seawater, whose temperature dependence is about 7-8% per degree Kelvin (or Celsius). i.e.* $\partial f_{Clouds} / \partial T_{surface} \approx 0.07/K$