Public Consultation on the Grid Development Policy for Offshore Wind in Ireland

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1. PROBLEM AND SOLUTION?

1.1 The three key steps to effective problem solving

Successful problem solving is based on the following simple steps:

1. Identify and Quantify the Problem: What are the impacts and their significance?

2. What Options are Available? Such as reduction at source, alternative energy sources, treatment technologies, etc.?

3. What Resources should be allocated? Do nothing? Do something? Do a lot?

As the introduction to the Public Consultation on Department of Communications, Climate Action and Environment website states:[1]

- *Ireland has ambitious climate targets towards 2030, including a target to develop at least 3.5 GW of offshore wind energy, as published in the Climate Action Plan (CAP) in June 2019. To meet these targets Government has to put in place a policy framework for the delivery model for offshore grid in alignment with National Marine Planning Framework (NMPF).*

1.2 Has the problem been correctly identified?

The same Department's website in its section on *"Climate Action Plan to Tackle Climate Breakdown"* clarifies:

- *Climate disruption is already having diverse and wide ranging impacts on Ireland's environment, society, economic and natural resources.*

These are impressive words designed to have great effect, even to the point of installing fear in some elements of the population. The summer of 2019 was also characterised by the media, and a significant percentage of the population who ape them, all wound up over a short-lived heat wave in the French and Benelux region and the significant bush fires in Australia. EU PP7 project "Fostering European Drought Research and Science-Policy Interfacing" evaluated extreme drought conditions in Europe over the last 500 years, which identified key drought events in Europe since 1500, e.g. 1566, 1666, 1719, 1818, 1893, and 1921.

In the author's half century, while weather plumes from the Sahara depositing fine sand on cars in Dublin, Ireland, is not a regular event, it has certainly happened on a number of occasions. The French wheat harvest of 2019 was the second largest in its history, while the ancestors of those who live in that region now, had regularly to cope with far worse weather events than the few hot days in the summer of 2019.[2] Equally one can point out, in exploring Australia's east coast in 1770; Captain James

[1] https://www.dccae.gov.ie/en-ie/energy/consultations/Pages/Consultation-to-Inform-a-Grid-Development-Policy-for-Offshore-Wind-in-Ireland.aspx

[2] http://www.breadandbutterscience.com/Weather.pdf

Cook described the land as "*a continent of smoke*" and recorded "*we saw smoke by day or fires by night wherever we came*".

Indeed, we now know from both Australia and North America that the aboriginal and Native American people were highly effective at living with and controlling their natural environment, with effective interventions by means of controlled burns. This they had learnt by carefully observing and understanding the environment around them and by their interventions actually enhanced it. Indeed, the failure to intervene in this manner, such as when responsibility for 'management' transferred to the new more 'environmentally aware' European settlers, led to the accumulation of vegetative growth and debris. In time fires with far more devastating consequences broke out, which in many cases resulting in such intense heat that they effectively sterilised the land. This not only took a long time to recover, but also with the unintended consequences that a different ecology often resulted.

In simple terms, the inability to monitor and understand the natural environment, coupled with bold interventions to change what was established practice, led to adverse unforeseen consequences, which were counterproductive. In this case, an ideological inability to appreciate that the regular combustion of the vegetative growth, was actually beneficial and not harmful to the natural environment given the climatic circumstances, which applied.

"*The measure of intelligence is the ability to change*."
— Albert Einstein

1.3 The climate which changes – What we did in the past and changed for the present

However, the careful analysis of the changes in our environment do not rest well with humankind's natural tendency to seek comfort in simple emotional based 'solutions'. Indeed, the famous US writer and social commentator of the 1920s, H.L. Mencken put it quite aptly;

- *"….. there is always a well-known solution to every human problem—neat, plausible, and wrong. The ancients, in the case at bar, laid the blame upon the gods: sometimes they were remote and surly, and sometimes they were kind. In the Middle Ages lesser powers took a hand in the matter, and so one reads of works of art inspired by Our Lady, by the Blessed Saints, by the souls of the departed, and even by the devil"*.

While the above is correct in terms of the rich heritage, in such as paintings and cathedrals, left to us from the Middle Ages, there were also aspects, which were rather darker, although rarely highlighted in modern times. As Section 2.2 goes on to document, our knowledge of the historical climate is that it goes through alternating periods of somewhat warmer and colder periods. The Medieval period was warm, and humanity flourished, but then a colder phase commenced around 1300, with the period of circa 1550 to 1850 commonly referred to as the 'Little Ice Age', the coldest phase spanning the interval 1645 to 1715.

This same colder period saw as many as one million individuals in Europe executed for the crime of witchcraft, with the largest number of persecutions occurring between 1550 and 1700. "*The trials were ubiquitous: conducted by both ecclesiastical and secular courts; by both Catholics and Protestants. The victims were primarily women,*

primarily poor and disproportionately widows".[3] The authority for this 'went to the top', *Summis desiderantes affectibus* (Latin for "desiring with supreme ardour") was a papal bull issued by Pope Innocent VIII in 1484 which recognised the destructive power of witchcraft linked to weather extremes:[4]

- *"It has indeed lately come to our ears . . . many persons of both sexes . . . have blasted the produce of the earth, the grapes of the vine, the fruits of the trees..., vineyards, orchards, meadows, pasture-land, corn, wheat, and all other cereals..."*

In reality, as discussed in more detail in Section 2.12, the Jetstream can and does meander, which causes significant climatic variation to Europe, in particular with respect to major outbreaks of cold weather. The 'Little Ice Age' being characterised by a more meandering Jetstream, which lead to climatic extremes, and weather events, which were 'not within living memory'. *"The wave of witch persecutions from 1623 to 1631 at Bamberg, Germany was centralized around a common event: the freezing and loss of the wine and grain crop"*.[5] The population demanded that the authorities act; these witches presented a direct threat to the common good. In a given year in the environs of the town of Bamberg the executions of over a hundred witches occurred.

The natural environment is a complex, dynamic system, which is constantly changing, sometimes subtly, sometimes less subtly. History shows us that mankind has all too often failed to understand this complexity, instead often adopting simplistic and rather fundamentalist / religious 'solutions', which have been quite disastrous in their own right. The core failure being the inability to appreciate these natural dynamics and see 'the wood from the trees'.

Such trials based on allegations of witchcraft play no role in modern European society, which is based, allegedly, on the 'rule of law' and in which the environment is a joint responsibility between the EU and its Member States. Holding these together and occupying the primary position in legal order is the Lisbon Treaty. As Article 191 of the Lisbon Treaty (TFEU), which is part of its Title XX on the Environment, requires:

- *2. Union policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Union. It shall be* ***based on the precautionary principle*** *and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that* ***the polluter should pay****.*

- *3. In preparing its policy on the environment, the Union shall take account of:*
  - ***available scientific and technical data,***
  - ***environmental conditions in the various regions of the Union,***
  - ***the potential benefits and costs of action or lack of action,***

[3] https://www.brown.edu/research/projects/oster/sites/brown.edu.research.projects.oster/files/uploads/witchec.pdf

[4] https://pages.uoregon.edu/dluebke/Witches442/SummisDesiderantes.htm

[5] https://digitalcommons.kennesaw.edu/cgi/viewcontent.cgi?article=1013&context=ojur

- ***the economic and social development of the Union as a whole and the balanced development of its regions.*** [Emphasis added in bold]

While this precautionary principle is only mentioned once and not specifically defined in the Treaty, there is a specific communication from the EU Commission,[6] which stresses how this has to be strictly interpreted within the context of risk management, and how:

- *"Measures based on the precautionary principle must not be disproportionate to the desired level of protection and must not aim at zero risk, something which rarely exists".*

Therefore, unlike in the witchcraft trials of the past, one cannot arbitrarily allege that somebody is a polluter and effectively 'fine' them huge sums of money relatively to what their business objectives can actually accommodate. There has to be an evidence base, involving at its core a weighing up the advantages and disadvantages, i.e. "*the potential benefits and costs of action or lack of action*". The days of 'mob rule' and trial by innuendo are, legally anyhow, gone.

1.4 The current climate disruption with its diverse and wide ranging impacts on Ireland's environment, society, economic and natural resources.

The above just reiterates the official position of the Irish Department of Communications, Climate Action and Environment, while Figure 1.1 overleaf is a line graph of Ireland's mean temperature for the last sixty years. It can be generated in less than 20 seconds from data stored on the website of the Central Statistics Office (CSO), as collected from the fifteen meteorological recording sites Met Eireann operate around the country.[7] What it clearly demonstrates is that the weather is boringly normal, and if any climate change is occurring, it is miniscule and not causing any adverse impacts. Indeed, those who have lived through those decades would concur with the data.

As the UN's Intergovermental Panel on Climate Change (IPCC) states:[8]

- *The climate system is a coupled non-linear chaotic system, and therefore the long-term prediction of future climate states is not possible*

This is another way of saying that it is complex and prone to variability, such variability as previously highlighted, which led in previous centuries to unfortunate social unrest and the targeting of weaker members of society. That storms, floods, extreme cold and drought arise is part of the natural system, and those on both sides of the 'Catastrophic Anthropogenic (manmade) Climate Change' debate, including the IPCC, acknowledge that there has been no increase in such forms of extreme

[6] Communication from the Commission on the precautionary principle COM/2000/0001 final: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2000:0001:FIN:EN:PDF

[7] https://www.cso.ie/px/pxeirestat/statire/SelectVarVal/Define.asp?Maintable=MTM02&PLanguage=0

[8] https://www.ipcc.ch/site/assets/uploads/2018/03/TAR-14.pdf

weather.[9] If there is any trend, it is actually downwards. Hence, we are actually living in 'good times'.

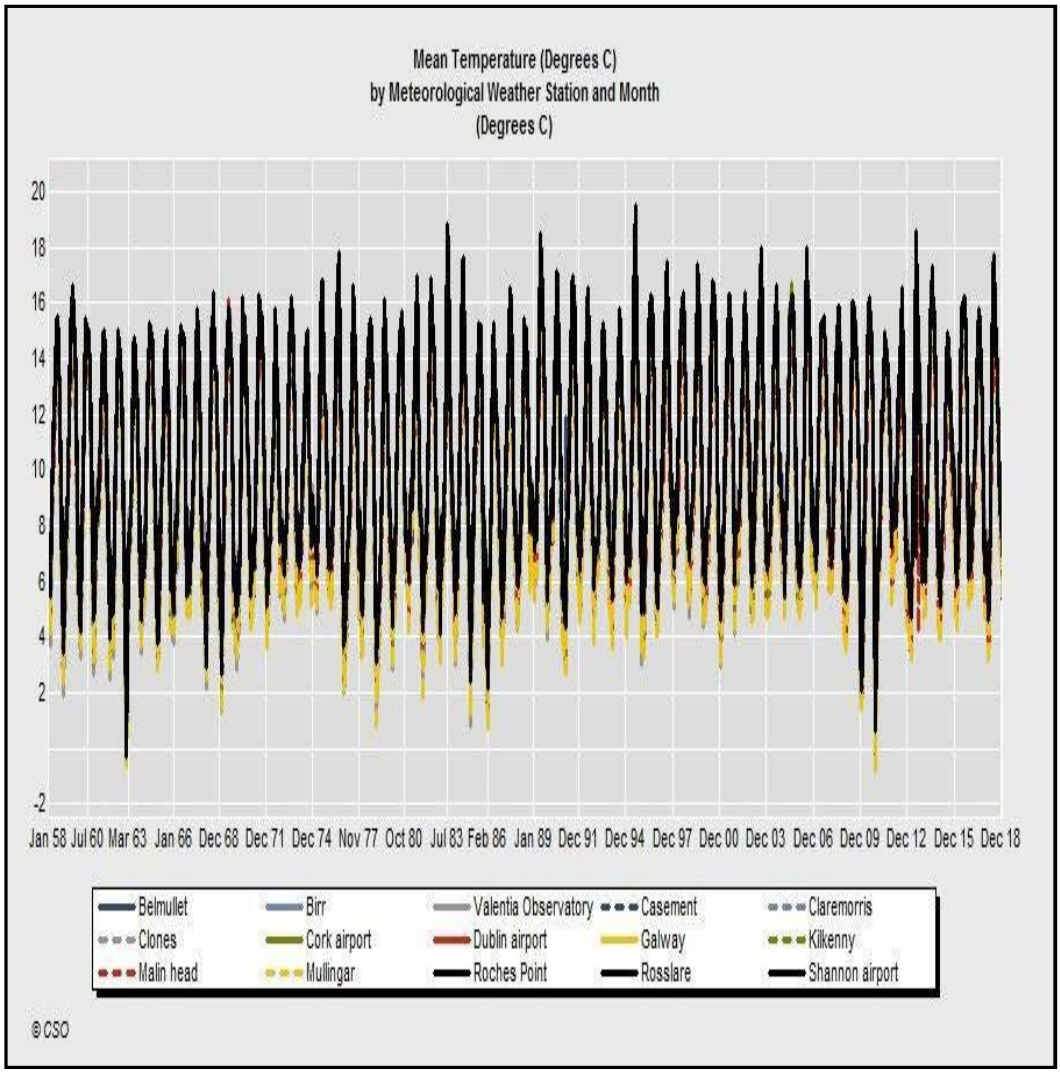


Figure 1.1: *Mean temperatures for Republic of Ireland for the Period 1958 to 2019*

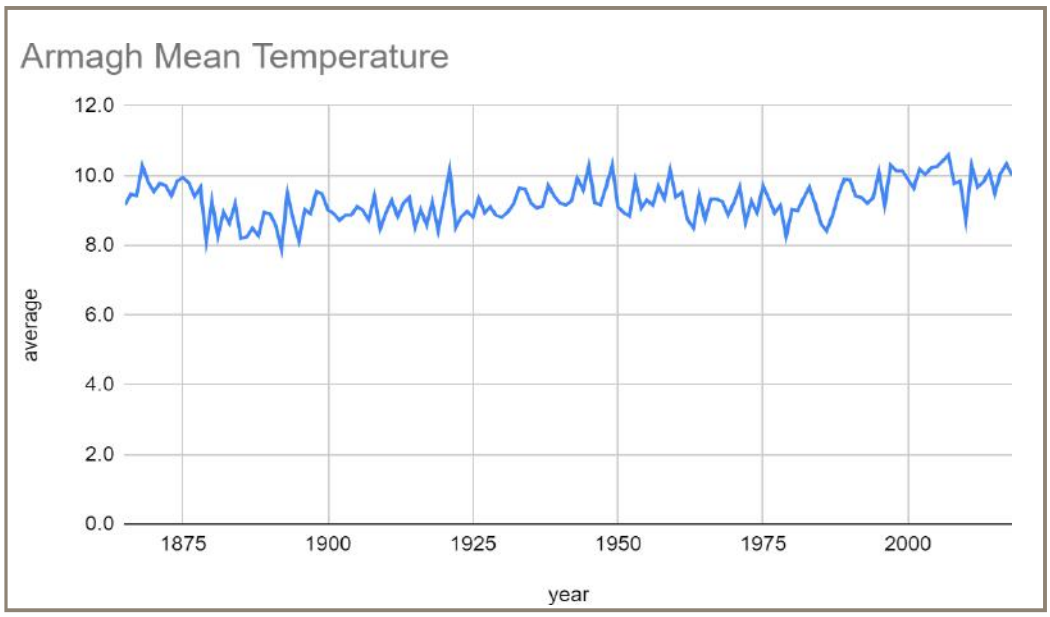
Ireland has a quite a number of meteorological stations which go back even further, for which the data can be obtained under the Access to Information on the Environment Regulations,[10] which transpose some of the requirements of the Aarhus Convention, more on this later. In N. Ireland, the similar UK Environmental Information Regulations (EIR) apply. These rights of access obtained the following data sets from Armagh, Birr, Valentia, Malin Head and Phoenix Park.

Armagh Observatory near the border of N. Ireland with the Republic is one of the oldest instrument temperature records on the planet, going back to the 1780s. It is also a rural area, which has changed little in the course of this period. Hence, the

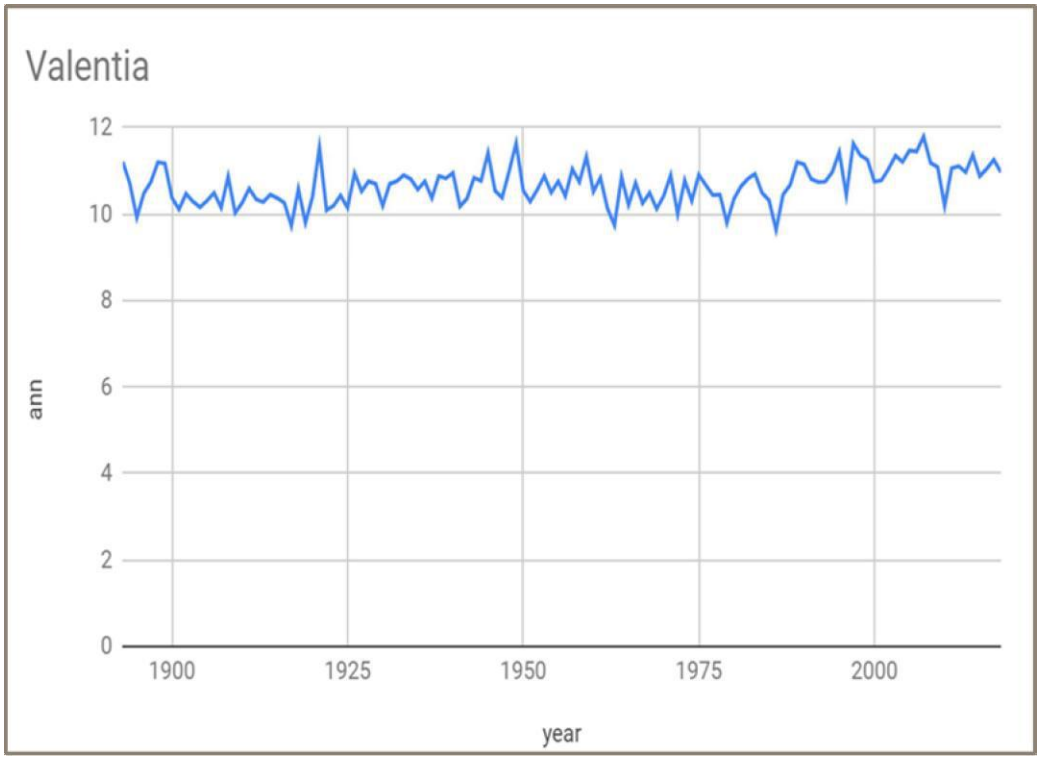
[9] https://www.thegwpf.org/content/uploads/2020/06/Alexander-Weather-Extremes.pdf

[10] https://www.met.ie/climate/services

record is of considerable value and has been subject to a number of scientific publications. Indeed, a presentation of the longer record is also available, see Section 2.2, which shows clearly that the most significant temperature rise occurred around 1830.

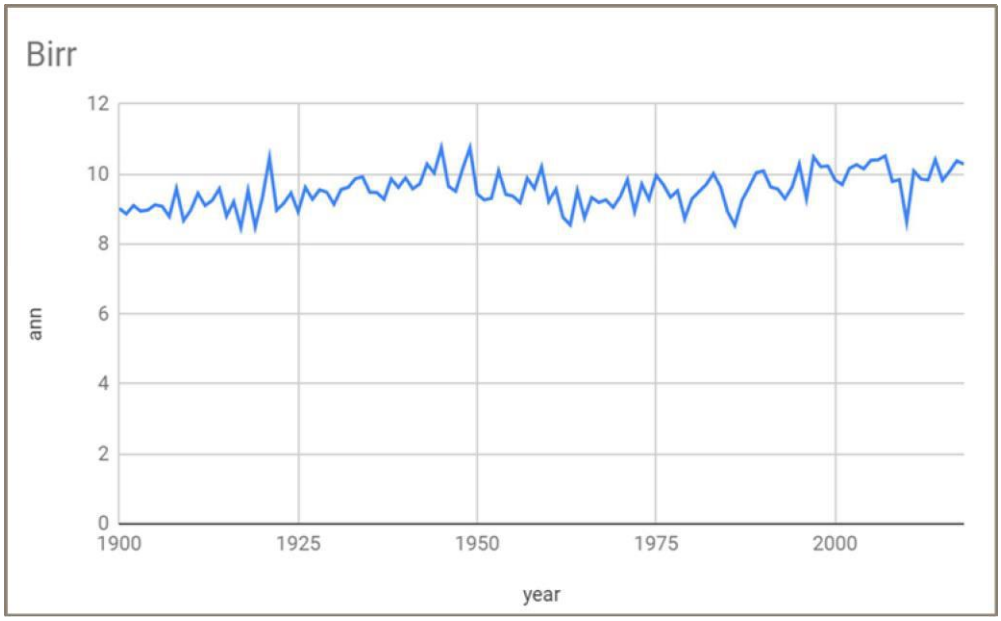


Valentia is an isolated rural meteorological observatory at a coastal location in S.W. Ireland, which has been in operation since 1860.[11]

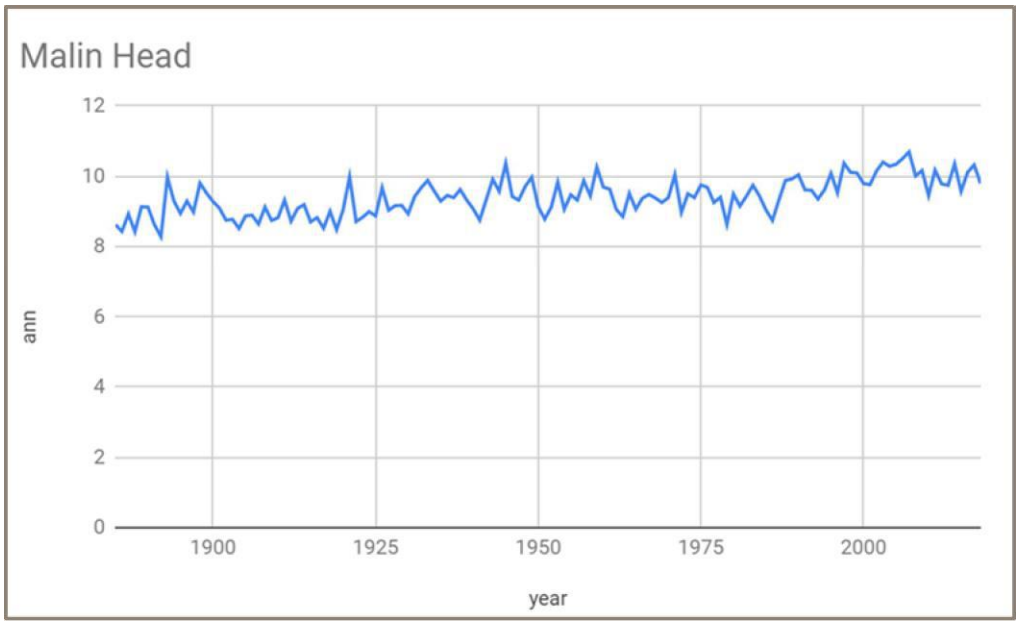


[11] https://www.met.ie/about-us/our-history/valentia-observatory

Birr is a famous observatory located in a rural area in the Irish midlands. Meteorological record keeping there goes back to the 1870s.[12]



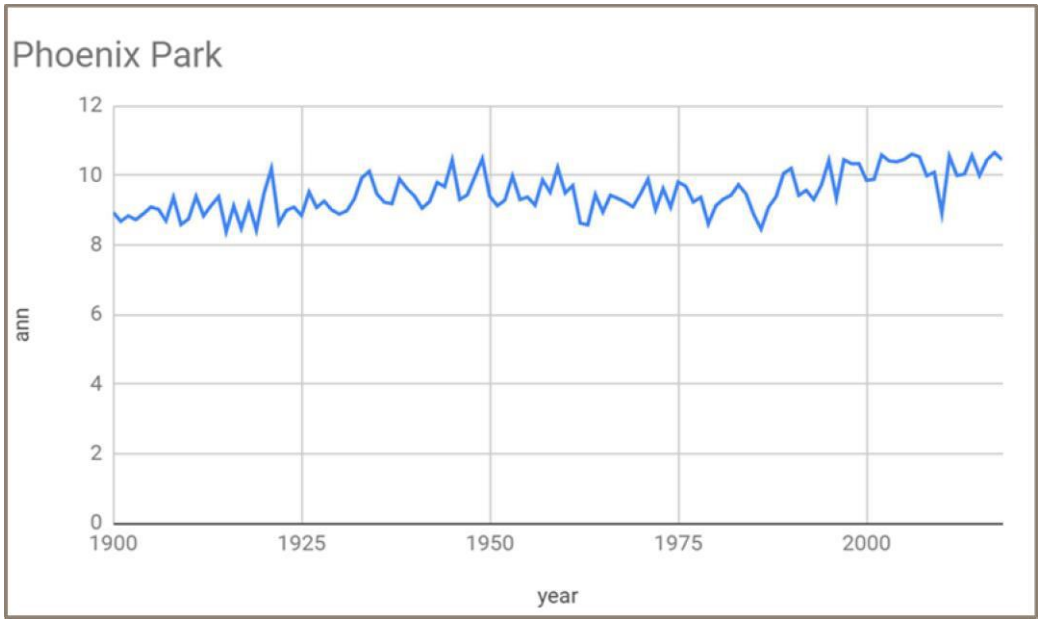
Malin Head is the most northerly headland on the Island of Ireland. The weather station formed part of an important Coastguard radio station and was prior to 1950 located at Lloyds Tower, in an exposed location right on the headland before subsequent relocation two miles inland to a more sheltered location. Hence, post 1950 the record does not trend with the previous three records, i.e. it is slightly warmer.[13]



[12] https://birrcastle.com/telescope-astronomy/

[13] http://www.malinheadcoastguardradio.com/History.html

Phoenix Park is a large urban park located right in the centre of Dublin. Meteorological record keeping there goes back to the 1850s and extends to 2013, when the closure of this meteorological station occurred. Geographically prior to 1950, one end of the park was effectively in the city centre, while the other end then effectively led into the countryside. However, recent decades were characterised by a rapid urbanisation of the Dublin metropolitan area, whose then population of 0.6 million has subsequently doubled. This subsequent urban heat island effect is evident in the Phoenix Park record post 1950, which trends slightly warmer than the first three meteorological stations.[14]



The changes above are so subtle, that you wouldn't even notice them. Claims that current climate changes are disruptive and wide ranging on Ireland's environment, society, economic and natural resources are simply false. For example air conditioning systems for buildings are designed not to exceed fluctuations of more than 1.1 °C within 15 minutes, nor change more than 2.2 °C within 1 hour.[15] Smaller fluctuations are not of relevance to the occupants.

Is it no surprise that a significant percentage of the Irish population simply do not see what the problem is? The Irish Times/Ipsos MRBI poll of 17th June 2020 finding for example that only 8% of voters considered 'climate change' a "*top priority*" for the next government when presented with a "*menu*" of possibilities. A significant majority, circa 36%, choosing instead "*rebuilding the economy*".

Furthermore, the language the Department use in their website to describe climate 'impacts', see reference above, versus their overarching legal obligation to reliably inform, is regretful and smacks of the language, which would instead be used in allegations of sorcery and witchcraft.

[14] https://www.macrotrends.net/cities/21542/dublin/population

[15] The long standing ASHRAE 55 air conditioning standard recommends that thermal variability should be limited to 2 ºF (1.1 ºC) in 15 minutes and 4 ºF (2.2 ºC) in one hour.

1.5 The staggering sums of money which are being allocated

Figure 1.2 below graphically shows the investment in renewable energy in Europe over the period 2004 to 2017. It is not difficult from this and other sources to determine that approximately a trillion Euros have been spent on this alleged climate change problem, which has had an enormous impact on the cost of electricity, an essential requirement for a modern society. A trillion, which is a thousand billion, is a word which rolls off the tongue easily. However, if a budget of €10 million was provided each day to sprinkle around the EU like 'pixie dust' for the 'common good', the trillion would run out in 274 years. Equally, it would have paid the majority of the EU's total food and drink bill in 2018 of €1.1 trillion.

As Figure 1.3 overleaf shows electricity prices in the EU have risen strongly, on average 3.9% per year, while general inflation has been less than half of this. Many commentators have pointed out the simple relationship, as shown in the following Figure 1.4, that the more renewable electricity capacity is installed, so too increases dramatically the cost of electricity to the consumer.

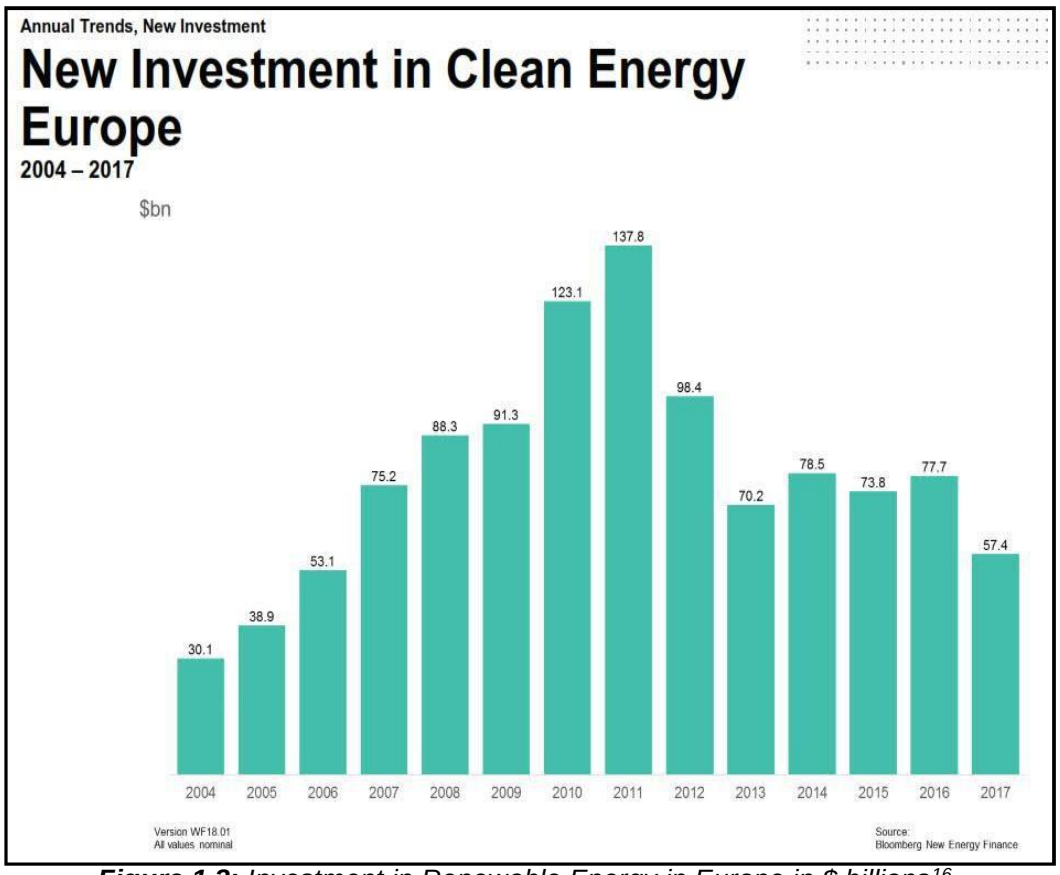


Figure 1.2: *Investment in Renewable Energy in Europe in $ billions*[16]

[16] https://data.bloomberglp.com/bnef/sites/14/2018/01/BNEF-Clean-Energy-Investment-Investment-Trends-2017.pdf

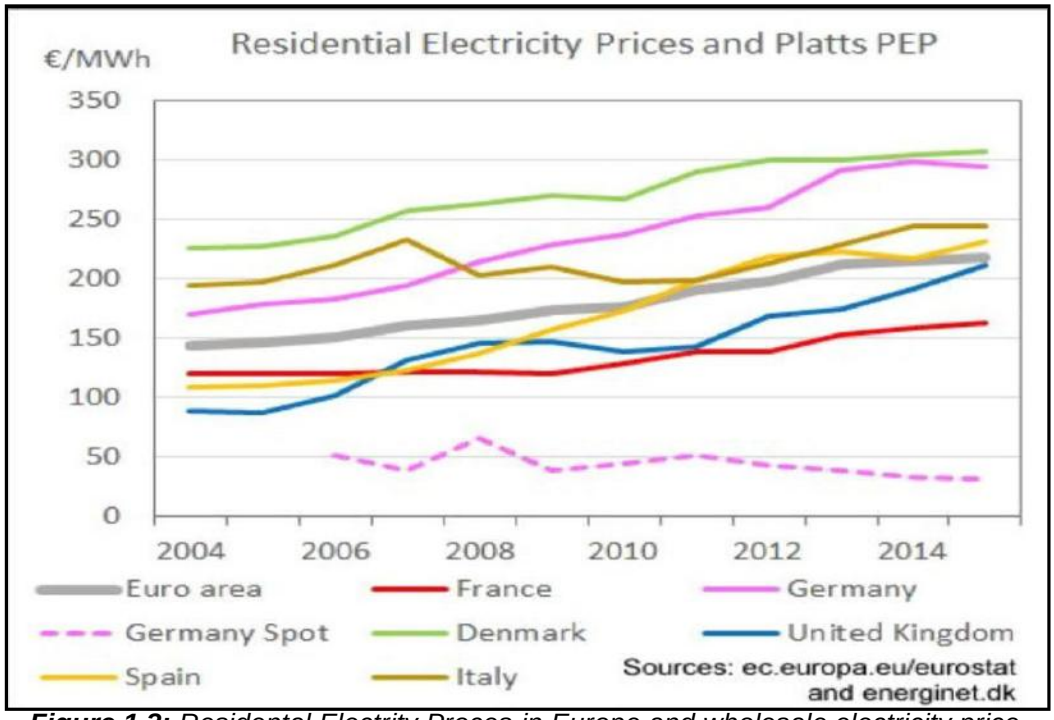


Figure 1.3: *Residental Electrity Proces in Europe and wholesale electricity price index (PEP)*[17]

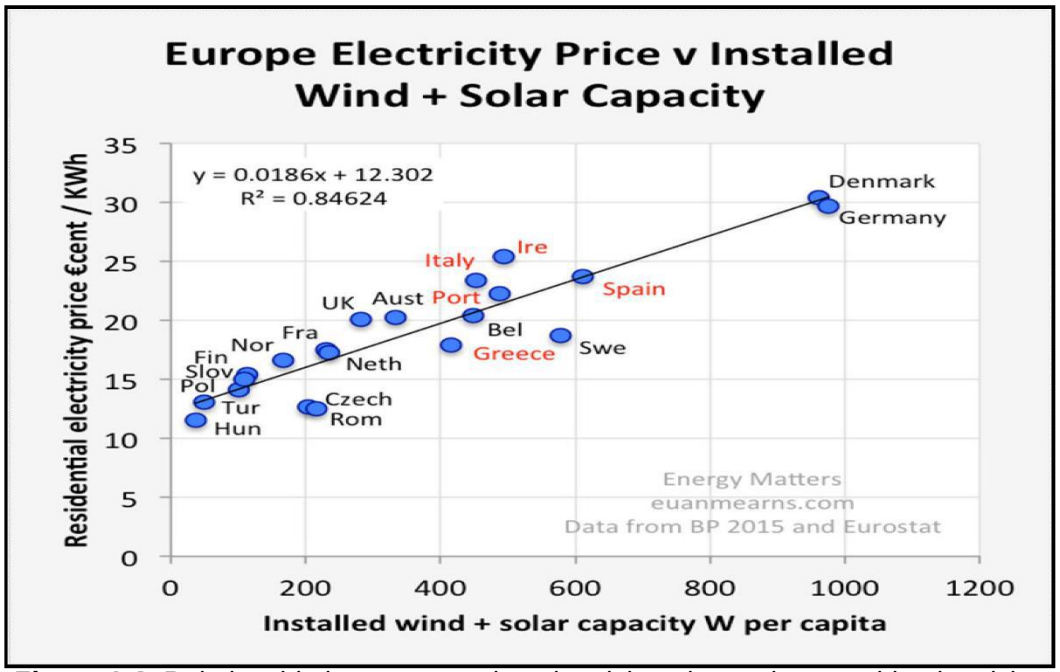


Figure 1.4: *Relationship between soaring electricity price and renewable electricity capacity*[18]

[17] http://www.pfbach.dk/firma_pfb/references/pfb_towards_50_pct_wind_in_denmark_2016_03_30.pdf

[18] http://euanmearns.com/green-mythology-and-the-high-price-of-european-electricity/

1.6 The unacceptable consequences to society and the environment

To put these sums of money further into perspective, the EU publishes every two years an energy price report, the last one being made available in Jan 2019.[19] The last year of 'full data' is 2016; circa €400 billion bill for energy sources, €212 billion being imported fossil fuels, plus an additional tax squeeze of €280 billion. €76 billion in subsidies for renewable sector equating to €208 million per day or €150 from each citizen. €48 billion paid direct to wind and solar generators on top of market price for 13% of EU's electricity. Market price plus tax paid to gas and solid fuel generators for 41% of electricity, whose fuel costs were same €48 billion.

The direct financial cost of these renewables is only part of a wider picture, which includes significant social and environmental costs. Figure 1.5 overleaf shows that an estimated 50 to 125 million people – between 10 and 25 percent of the EU's population – are at risk of "energy poverty" a fact which even those avidly promoting 'Green' policies have to acknowledge.[20] This situation is being made worse by rapidly rising electricity prices. The doubling of residential electricity prices in Germany has led in 2017 to some 340,000 households in German having their electricity disconnected, due to their inability to pay bills, a rise of 14,000 on the previous year.[21] In the EU as a whole, poorer households are most affected, as over 10% of their income goes on energy costs.

The same EU data also shows that average industrial prices for electricity and natural gas are twice those in the USA, [22] leading to a serious loss of industrial competitiveness, resulting in job losses particularly in the more traditional energy intensive sectors.[23] This is a loss of competitiveness, which will only widen, as other countries are not pursuing the same energy objectives. However, as an increasing political backlash is occurring to these unsustainable rising energy costs, the enormous level of expenditure in renewable investment has had to be curtailed by the reduction in subsidies available, which can be seen in the resulting falloff in the renewable investment trend in Figure 1.2.

[19] https://ec.europa.eu/energy/data-analysis/energy-prices-and-costs_en

[20] https://www.boell.de/en/european-energy-atlas-2018

[21] https://www.faz.net/aktuell/finanzen/meine-finanzen/mieten-und-wohnen/verbraucher-zahlen-hunderte-millionen-euro-fuer-ungenutzten-oekostrom-15936120.html

[22] https://ec.europa.eu/energy/en/data-analysis/energy-prices-and-costs

[23] https://www.politico.eu/article/eu-energy-plans-put-jobs-at-risk/

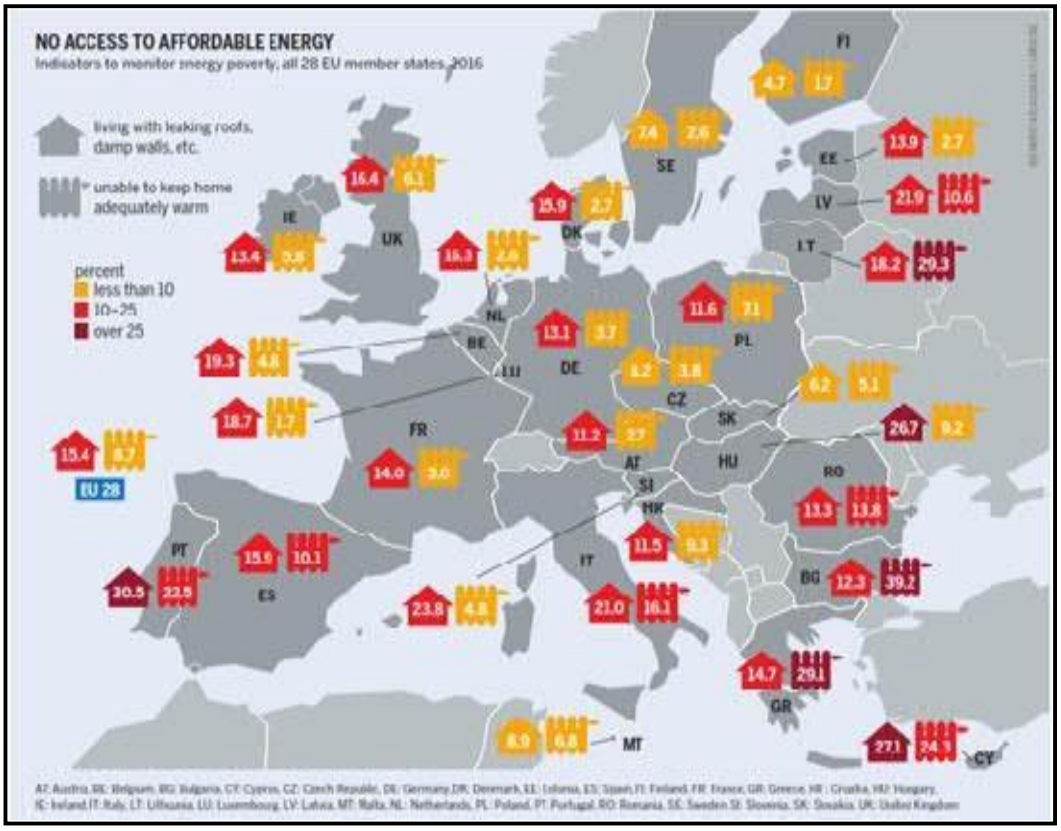


Figure 1.5: *Extent of energy poverty in EU*

As regards the environmental cost, many areas of EU have suffered radical changes in landscapes altered by enormously intrusive wind turbines, Germany for instance having installed more than 30,000 such turbines. As the German wild animal foundation points out with respect to the unacceptable impacts of any further wind turbines being installed in forested areas, some 250,000 bats and 12,000 raptors (birds of prey) are already being killed by wind turbines each year in Germany.[24] After several years of intensive conservation measures in the 1980s and 1990s, the number of successful raptor breeding pairs, which was increasing, is now once again in decline.

1.7 What is actually being delivered by these staggering sums of money

One could justifiably question as to what is exactly being delivered to justify this huge cost? The answer sadly is little or nothing. For example many commentators point to the enormous 'black hole' that is German's 'Energiewende' or renewable energy transformation.[25] Not least as Figure 1.6 overleaf shows, following reunification there was a decrease in German emissions as East German industry was modernised. But in the last decade, despite the hundreds of billions of Euro invested in Energiewende, national emissions have not measurably decreased and Germany will miss its 2020 target climate emissions by a significant percentage.

[24] https://www.deutschewildtierstiftung.de/naturschutz/windenergie-und-artenschutz

[25] https://www.politico.eu/article/germany-climate-change-green-energy-shift-is-more-fizzle-than-sizzle/

France, which traditionally generated nearly 80% of its electricity from nuclear energy had in 2016 some 10% of the carbon intensity inherent to German electricity production, while its electricity costs were nearly half those of Germany.[26] However, because France is now pursuing more renewable energy, both the cost of its electricity and the carbon intensity of that electricity are now rising.[27] Indeed, it was the government announcement of a further punitive carbon tax on petrol and diesel, in order to finance more renewables, which led to the massed 'yellow vests' demonstrations. Many of those protesting were, quite rightly, questioned as to if their leaders had lost all sense of reason and logic.

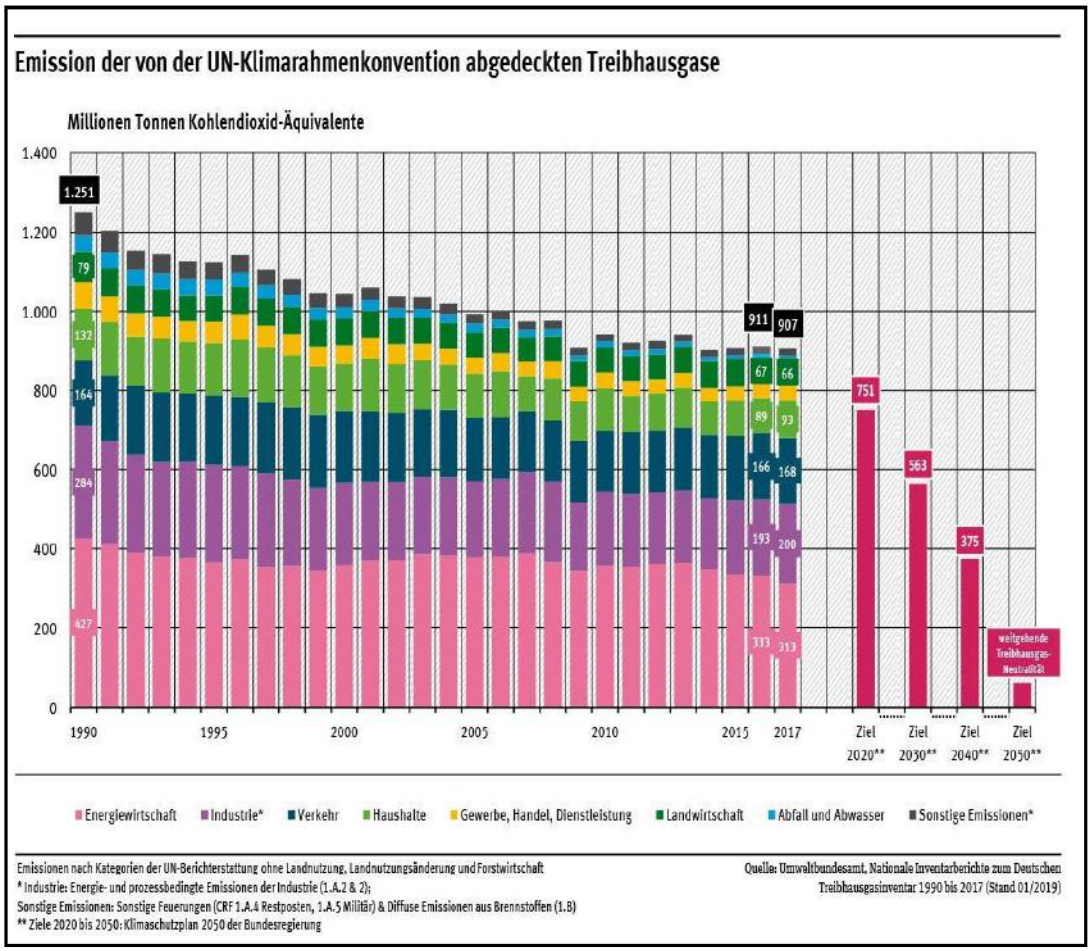


Figure 1.6: *German emissions of greenhouse gases in million tonnes of CO_2 equivalents 1990 -2017; from bottom, energy sector, industry, traffic, households, 'commerce, trade and services', agriculture, waste and wastewater, other emissions. Targets on the right for 2020, 2030, 2040 and 2050: Source German Federal Environment Agency (UBA)*[28]

[26] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Electricity_prices,_First_semester_of_2016-2018_(EUR_per_kWh).png

[27] https://www.forbes.com/sites/michaelshellenberger/2019/02/05/if-saving-the-climate-requires-making-energy-so-expensive-why-is-french-electricity-so-cheap/

[28] https://www.umweltbundesamt.de/daten/klima/treibhausgas-emissionen-in-deutschland/kohlendioxid-emissionen#textpart-1

The situation isn't any better here in Ireland. As Figure 1.7 below shows, the Irish emissions from this electricity generating sector (1.A.1 Energy Industries) grew in the 2000s, but decreased by 2010 and has little changed since then. The period 2000 to 2008 was of course the period of rapid 'Celtic Tiger' economic growth in Ireland, but it also saw the investment in a considerable number of modern thermal power stations. By 2010 most of these were commissioned and operational resulting in the decrease in emissions to be seen from the 'energy industries' sector.

As installed wind energy in the Republic of Ireland increased from 1,379 MW in 2010, when it provided 9.7% of electricity, to 3,666 MW in 2018 providing 28.1%, one would expect to see a significant reduction in CO_2 emissions from the 'energy industries' sector. Particularly as over the same timeframe, there was little or no growth in Irish electricity demand and this represented the intrusion of over 1,100 additional large wind turbines on the Irish landscape. Yet Figure 1.7 below shows that emissions attributed to 'energy industries' are little altered.

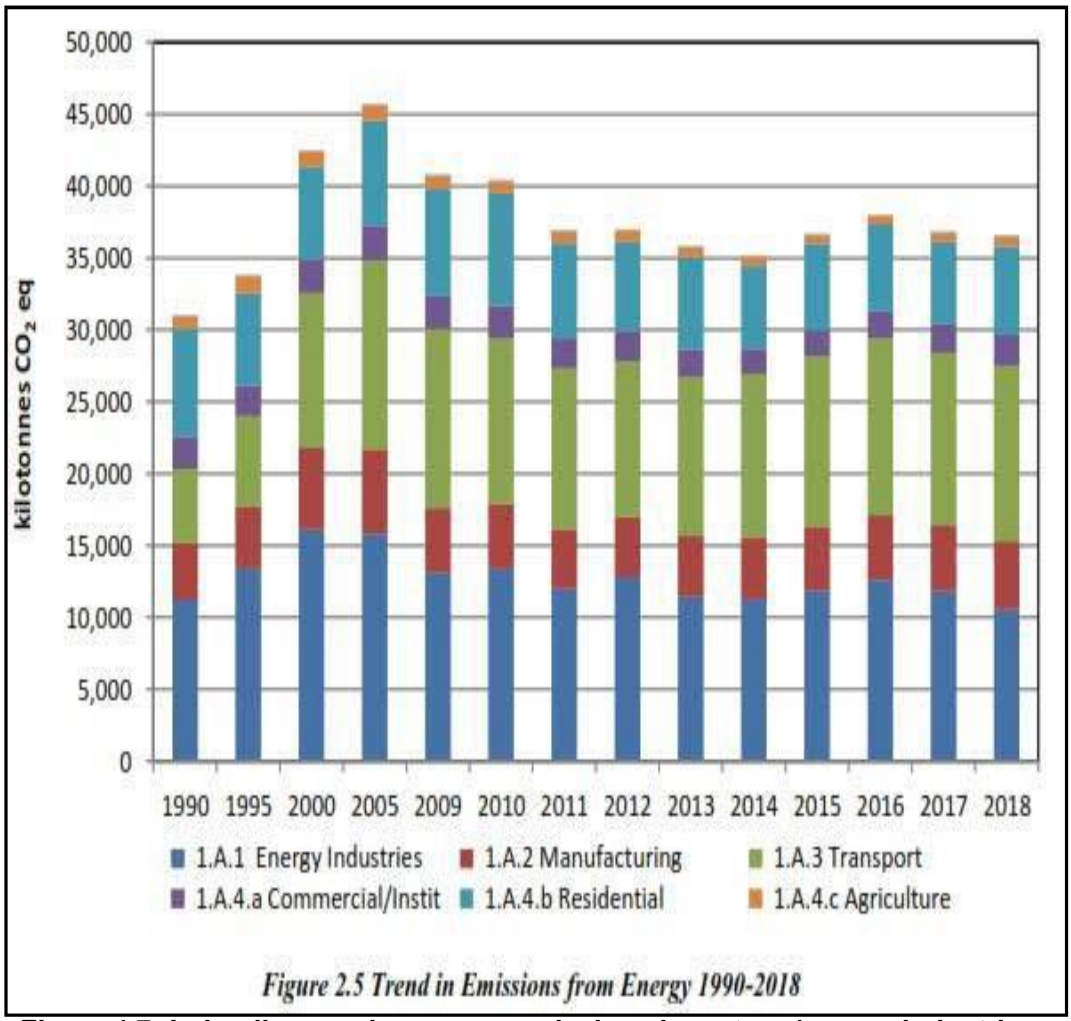


Figure 1.7: Ireland's greenhouse gas emissions inventory (energy industries bottom blue) – Source EPA[29]

[29] Ireland's National Inventory Report 2020: http://www.epa.ie/pubs/reports/air/airemissions/ghg/nir2020/NIR%202020_Merge_finalv1.pdf

The first thing chemical engineers do when they start the design of an industrial facility is to complete heat and mass balances. The former document the energy flows, while the latter do likewise for material flows. While the data for Ireland is limited to annual returns for the period 2012 to 2018, some interesting deductions can be made.[30] Furthermore, the Irish electricity grid is like a small microcosm of this giant EU renewable programme. There are only nineteen power stations forming the emissions data in Figure 1.7. There is a single large 900 MW coal fired plant, commissioned in the mid-80s, which used to provide circa 25% of the Republic of Ireland's electricity. There are three smaller modern and efficient peat fired plants, while the rest essentially comprise modern high efficiency combined cycle gas turbine technology.

Percentage of principal energy sources used to generate electricity in the Republic of Ireland

Energy Source in Gross Electricity Consumption	2012 (%)	2017 (%)	2018 (%)
Total Renewables	18.9	30.1	33.1
Wind	15.3	25.2	28.1
Gas	49.4	51.1	51.8
Coal in conjunction with supplementary oil	20.7	12.4	7.5
Net generation (TWh)	27.4	25.9	27.1

In simple terms the strategy pursued between 2012 and 2018 was to 'replace' half the output of this coal fired plant with the output from 1,100 new wind turbines, each costing €4 million to install. Electricity generation, in modern Irish gas turbine power plants, emits 40% the CO_2 arising from generation with more difficult to combust carbonaceous coal. In 2012, gas generated half of Irish electricity, as it did again in 2018, but this time with a significantly higher gas consumption. When your car comes off the motorway and goes into 'stop start' urban driving it burns more fuel, just like power plants forced into such operation, as more and more intermittent wind energy pours on and off the grid, see Figure 1.8 below:

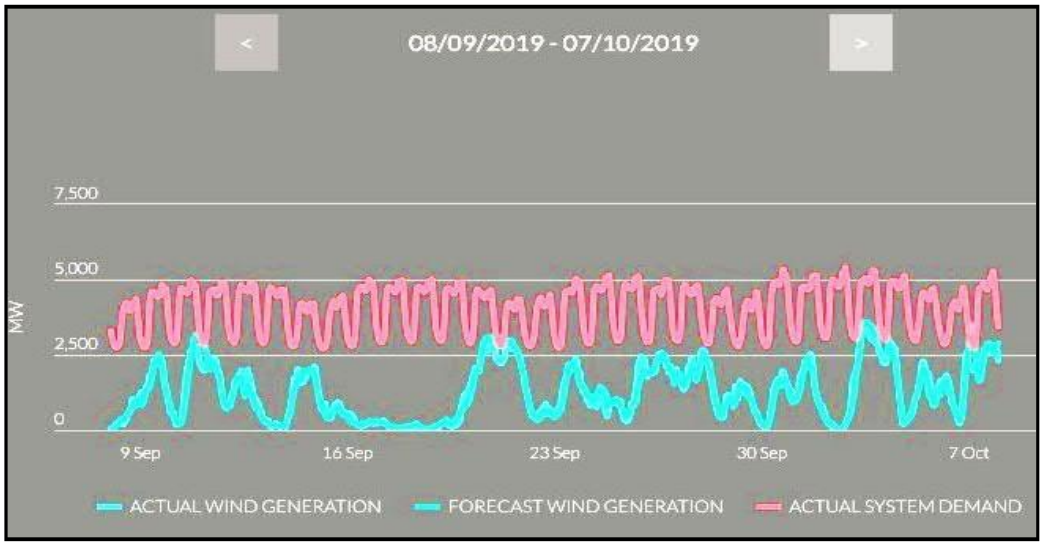


Figure 1.8: All Ireland electricity demand and wind energy output for period 8/9/2019 to 7/10/2019[31]

[30] Such as is published by the Sustainable Energy Authority of Ireland (SEAI).
[31] http://smartgriddashboard.eirgrid.com

The extra gas combusted was well capable of supplying Ireland with 4% of our electricity. Simply switching this coal generation to natural gas and running Irish plants efficiently could have realised over 70% of the emissions savings claimed for renewables. In fact, this is what the USA did in the period 2008 to 2017 and obtained a 27% reduction in CO_2 emissions from their power generation sector.[32] For the EU in the period 2008 to 2018, i.e. a year longer, the reduction in CO_2 emissions from the same electricity sector was 28%.[33] In comparison to the EU the USA installed relatively little wind and solar power and its electricity prices did not rise in the same manner as the EU, as a result now being some half of the rate now charged in the EU.

The concept that such a large deployment of wind energy would successfully deliver significant emission savings was dysfunctional, easily explained by the inherent limitations of this technology. It is also worth noting, as to how experienced engineers have repeatedly criticised the lack of techno-economic fundamentals to support this wind energy programme, while there has also been a direct refusal to listen to them.[34]

The laws of nature are just that laws, and one has to work within their limitations. Kinetic energy is the product of half the mass by the square of the velocity. A cubic metre of water (1,000 litres) weighs a tonne (1,000 kg), while a cubic meter of air only weighs 1.2 kg. Harvesting flowing water for energy makes sense; while equally, a flood of water has a lot of destructive energy. However, to achieve any reasonable return on an investment for harvesting flowing air (wind), an awful lot of air travelling at a significant velocity is required.

While Ireland is considered windy with respect to other countries, the average wind speed in Ireland is still only circa 5.6 m/s, which is not a lot more than a gentle breeze. [35] This average of 5.6 m/s is highly relevant given that it takes circa 13 m/s before a wind turbine will reach its full design power output.[36] Reducing this design wind speed by a half (e.g. 13 m/s to 6.5 m/s), results in the power output decreasing by a factor of eight from 100% to 12.5% of design output. This is a fundamental law of physics,[37] related to wind as a source of kinetic energy and no future developments in wind turbines can alter this. Therefore, while the rotor blades will

[32] https://www.eia.gov/electricity/annual/html/epa_03_02_a.html
See for example Figure 9: https://www.eia.gov/environment/emissions/carbon/
https://cfpub.epa.gov/ghgdata/inventoryexplorer/#electricitygeneration/allgas/source/all

[33] https://ec.europa.eu/eurostat/data/database

[34] For example, Irish Academy of Engineering: “Energy - Energy Policy and Economic Recovery 2010 – 2015”; Section 9:
http://iae.ie/wp-content/uploads/2017/07/IAE_Energy_Report_Web2_05.04.2011.pdf

[35] Equivalent to 11 knots or 20 km/h: https://www.rmets.org/resource/beaufort-scale As documented in: https://irishweatheronline.wordpress.com/climate-of-ireland/

[36] Equivalent to 25 knots or 47 km/h. For example, as documented by:
https://www.researchgate.net/publication/270586944_The_impact_of_wind_uncertainty_on_the_strategic_valuation_of_distributed_electricity_storage

[37] Kinetic energy is $0.5mv^2$, where m is mass and v is wind velocity. The mass of air which passes through a wind turbine in a second is the area covered by the blades by the velocity by the density. Hence, energy per unit time (power) is proportional to the cube of the velocity.

turn in light winds, the generator will not input any significant power into the grid, the blades are in effect 'freewheeling'.

It therefore takes more than double Ireland's average wind speed before the wind turbines reach their design output, while at this average wind speed they are producing less than 12.5% of their design output. As double the average does not occur very often, while equally less than the average occurs quite frequently, over the course of the year a turbine in Ireland will at best produce 27% of its design output.[38]

As a result claims made in relation to the capability of a wind turbine to power 'x' number of homes, are false and scurrilous, as this inherently unreliable and intermittent source of electrical energy, has to be fully backed up by conventional power stations. Not only can wind energy not power a single home, but also the conventional power stations are now operating in an increasingly inefficient manner. A situation not helped by the meteorological fact that weather systems are common over large geographical areas, such that the turbines effectively rush on and off the grid at in the same timeframe. See previous Figure 1.8.

Nor can energy storage provide an answer at this scale, as soon as one sits down and works out the scale of what is required, the absurdity becomes clear. For example, German engineers have calculated that if their electricity generation was by wind and solar energy and there were a number of calm cloudy days, requiring electrical supply from pumped storage. It would first be necessary to pump the 48 km^3 of water in Lake Constance (Bodensee) up to the level of the Zugspitze, which is their highest mountain at nearly 3,000 m. Even with conversion of all the vehicles in Germany to battery power, their capacity would only suffice to provide the country with electricity for five and a half hours.[39] It is not just the technical barriers, but also the costs, which are staggering.

It is not the intention here to assess the huge financial and environmental costs associated with this strategy, and these calculations have limitations based on the extent of the data available, yet it is crystal clear that that strategy pursued was not particularly effective in delivering emission savings. It also begs the question, before pursuing such strategies in the future to replace the remaining solid fuel generation capacity in Ireland, is it not sensible to first analyse all this massive expenditure and its impacts on landscape, people, electricity costs, etc. Rather than a succession of clearly pompous claims, that it is delivering essential emission savings to save the planet. Furthermore, when no form of assessment is being actually completed to justify this wind energy programme, how can one legitimately fund it? The 'polluter pays principle' cannot be applied simply by making innuendos, such as in the days of sorcery and witchcraft.

[38] See for example Section 3.1 of: http://www.eirgridgroup.com/site-files/library/EirGrid/Annual-Renewable-Constraint-and-Curtailment-Report-2018-V1.0.pdf

[39] https://www.bs-energy.de/fileadmin/BS_ENERGY/unternehmen/presse_fotos_aktuelles/Energiebuendel_PDFs/energiebuendel_2013_01_maerz.pdf German pumped hydro capacity is currently 0.05 TWh and this could have to increase to a minimum of 20 – 40 TWh and realistically 80 TWh if not greater: https://deutscherarbeitgeberverband.de/Artikel.html?PR_ID=582

1.8 The manner in which these staggering sums of money were allocated

Article 3 of the Lisbon Treaty (TEU) states:

- *The Union shall establish an internal market. It shall work for the sustainable development of Europe based on balanced economic growth and price stability,* ***a highly competitive social market economy****, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment. It shall promote scientific and technological advance.* [Emphasis in bold added]

The EU defines 'State Aid' "*as an advantage in any form whatsoever conferred on a selective basis to undertakings by national public authorities*".[40] Renewable operators obtain priority access to the grid, such that when the wind is sufficiently strong, conventional generators are obliged to shut down or throttle back, to enable wind energy to access the grid for the period it is available. Renewable operators also receive subsidies provided specifically to their sector, such as guaranteed prices (tariffs), set at a value above the expected market rates for electricity.

Therefore, a State intervention occurs conferring significant advantages to this sector, while distorting completion and hence detrimentally affecting the citizen's right to access a highly competitive market price for the required commodity. There is of course a general EU prohibition on such State Aid, as ultimately, it leads to the 'planned economy', characteristic of the situation found for so many years behind the 'Iron Curtain', and we know what happened there.

REFIT is EU State Aid for Environmental Protection to fund the Irish renewable programme and in the application for REFIT I in 2007 to approve 1,450 MW of wind energy[41] the following information was supplied by the Irish Department of Communication, Energy and Natural Resources on projected emission savings based on the fact that wind technology would be the dominant technology:

Emissions	***Annual*** *savings per 100 MWs installed* *Tonnes of oxide*
Carbon Dioxide	*0.19 ml.*
Sulphur Dioxide	*4k*
Nitrogen Oxides	*1.3k*
	Ml = millions K = thousands

[40] https://ec.europa.eu/competition/state_aid/overview/index_en.html

[41] PART III.10 SUPPLEMENTARY INFORMATION SHEET ON ENVIRONMENTAL PROTECTION AID

Therefore the State Aid application claimed that for each 1,000 MWs of installed wind energy capacity, 1.9 million tonnes of CO_2 savings should result. However, the official Irish National Renewable Energy Action Plan (NREAP) progress report of February 2014 claimed 1.17 million tonnes of CO_2 savings per 1,000 MW, while the calculations based on the data referred to above for 2018 show that less than 0.49 million tonnes per 1,000 MW actually occurred, i.e. only 26% of the savings paid for.

In February 2012, when the EU approved, a further 4,000 MW of wind energy representing a capital investment of some €8 billion, they did so on the back of a 'one pager' from the Irish authorities. This simply stated that by 2009, 14.4% of Ireland's electricity was from renewable sources and this new State Aid would contribute to achieving the target of 40% of electricity from renewable sources.[42]

Given that Ireland's emissions are about 60 million tonnes per year, see Figure 1.7 above, and global emissions from fossil fuels and industry are approximately 36 billion tonnes per year,[43] this saving from Irish wind energy represents less than 3% of Irish emissions and 0.005% of the global total. Despite this massive costs have had to be paid by the electricity consumer. While the Irish State has never prepared any cost benefit data for this renewable programme, it can easily be estimated that it is costing Irish citizens €1.2 billion per year.[44] Indeed, the Irish Academy of Engineering was pointing out in 2014 that the electricity rates were some 50% higher than they would have otherwise been in order to fund the Government mandated renewable investment.[45]

A key element of EU legislation, and as highlighted previously with respect to the Lisbon Treaty and its interpretation of Article 191 on the environment, is of course proportionality. This key element of EU jurisprudence has been the focus of many judgments of the European Court articulating the following principle:

- *"….according to settled case-law, the principle of proportionality, which is one of the general principles of European Union law, requires that measures adopted by the European Union institutions do not exceed the limits of what is appropriate and necessary in order to attain the objectives legitimately pursued by the legislation in question; when there is a choice between several appropriate measures, recourse must be had to the least onerous, and the disadvantages caused must not be disproportionate to the aims pursued."*[46]

[42] See documents of 13.03.2012:
http://www.unece.org/env/pp/compliance/Compliancecommittee/54TableEU.html

[43] See Section 2.3 and: https://www.globalcarbonproject.org/carbonbudget/18/highlights.htmc

[44] http://en.friends-against-wind.org/doc/Wind_Aware_The_Costs_of_Wind_Energy_in_Ireland.pdf

[45] http://iae.ie/wp-content/uploads/2017/07/Energy_Policy_Green_Paper_-_IAE_Response_31.07.14.pdf

[46] For example ECJ, 07.03.2013, T-370/11, *Poland v Commission*
http://curia.europa.eu/juris/documents.jsf?num=T-370/11

Not surprisingly therefore, in the Commission's guidelines for State Aid for Environmental Protection (2008/C 82/01),[47] there is a specific Section 1.3.5 on the 'Proportionality of the aid', which clarifies: "*Aid is considered to be proportional only if the same result could not be achieved with less aid"*. There are in fact eleven sources of renewable energy, as defined in Directive 2009/28/EC, the EU's legislation for its 20% by 2020 renewable energy programme.

- *'energy from renewable sources' means energy from renewable non-fossil sources, namely wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases;*

In 2004, the Irish grid was characterised by a limited number of power stations run by the semi-state company ESB, who published a report on the "Impact of Wind Power Generation in Ireland on the Operation of Conventional Plant and the Economic Implications".[48] At that time, the EU had set for 2010 a renewable electricity target of 13.2% for the Republic of Ireland. In early 2004, there was an insignificant 210 MW of wind energy connected to the Irish grid, with plans to raise this to 1,700 MW. The study addressed the impact this intermittent wind energy input would have on the operation of the conventional power stations and concluded:

- *The adverse effect of wind on thermal plant increases as the wind energy penetration rises. Plant operates less efficiently and with increasing volatility*.

The ESB report also concluded that using wind energy in this manner to meet this 13.2% target would translate to a CO_2 abatement cost in excess of €120/tonne, which as they pointed out, appeared high relative to other alternatives. Note: On a 2020 price basis this equates to €140 per tonne,[49] which is nearly six times what carbon reduction projects were trading for in 2020 pre COVID on the EU Emissions Trading Scheme EU-ETS i.e. typically €25 per tonne.

In Waste to Energy facilities the municipal waste is combusted at a minimum temperature of 850 ^{0}C producing high pressure steam for electricity generation and hot water for use in district heating. Some 50% of the waste is of biogenic origin (biomass) and therefore 50% of energy produced is from a renewable source. In the same timeframe as the 2004 report, the scientific literature was reporting that the cost to avoid a tonne of CO_2 utilising Waste to Energy technology was about €43, while with additional district heating systems supplementing the electrical output, this avoidance cost reduced to the range €7 to €20. Indeed, even with (other) biomass fuels specifically grown for renewable energy, the avoidance cost was still only €80 per tonne.[50]

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[47] https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A52008XC0401%2803%29 These were subsequently superseded in by those adopted for the period 2014-2020 (2014/C 200/01).

[48] Available at: https://docs.wind-watch.org/EirGrid-WindImpact-Main.pdf

[49] https://www.cso.ie/en/interactivezone/visualisationtools/cpiinflationcalculator/

[50] For example: https://www.powerengineeringint.com/articles/print/volume-15/issue-5/features/waste-to-energy-energy-no-time-to-waste.html and Section 7.7 of: https://www.umwelt.nrw.de/fileadmin/redaktion/PDFs/umwelt/munlv_klimaschutz_endbericht.pdf

As Figure 1.8 above shows, even in September a traditionally windy month, for large periods there is simply little or no wind energy input, which when it is available then rushes on to the grid for a short period, as a low pressure system moves over the country. During these periods of peak wind energy input to the grid, the wind energy is nearly equal to the troughs occurring in the system demand, i.e. corresponding to the night time periods.

This irregular supply of wind energy causes huge problems with the existing generators on the grid, as they have to reduce their output or even cease generation for the period in which the wind energy rushes on to the grid, a procedure called curtailment. Not only are the fossil fuel generators curtailed, but so too are the two Waste to Energy plants in Ireland, which produce electricity, which is 50% renewable.

The incoming waste arrives on a continuous basis and it is necessary to maintain the furnaces at a minimum temperature of 850 °C to prevent the formation of hazardous pollutants. Normally the steam subsequently generated in the boilers is routed to the steam turbines for power generation, but when the Waste to Energy plant is curtailed off the grid, this steam has to be dumped to the plant cooling system. Already in 2018, some 7% of the electrical energy from these plants is being curtailed, which is equivalent to dumping 1.5 times the annual electrical requirement of the Dublin suburban rail network (DART), a figure which is rising as more wind energy is installed in Ireland.

Ireland has very limited hydro resources generating only 2.2 % of its electricity in this manner. However, the State's main industrial achievement subsequent to its foundation in 1921, still considered by the Irish public to be a prestige project, was the River Shannon hydroelectric scheme providing 80 MW at its peak flow. Waste to Energy is less glamorous, but provides renewable electricity in an equally reliable manner, and even with only two facilities, their electrical output already supplies 1% of Irish electrical demand, exceeding the output of this 'prestige' project. Yet in 2020, there is still another 720,000 tonnes of Irish municipal waste either exported to Waste to Energy facilities abroad or disposed of via landfill in Ireland. Waste to Energy's renewable potential in Ireland therefore equates to the contribution obtained from hydroelectricity.

It is also no secret that during the period of adoption of Ireland's renewable programme in 2010, there were two Green Party Minister's, one for Energy and the other for Environment. The former was characterised by what many considered an ideological crusade for an enormous roll out of wind energy,[51] while the latter was characterised for an equal ideologically crusade to prevent the construction of Waste to Energy plants.[52]

One can only conclude, that simply staggering sums of money are now having to be paid by European and Irish electricity consumers, for a so called 'solution' to a problem, which isn't occurring, and for which even if it was occurring, this so called 'solution' is incapable of delivering anything of merit. Furthermore, there were far more cost effective measures to achieve the same emissions reductions, within the

[51] https://www.independent.ie/business/irish/ideology-is-driving-our-energy-policy-instead-of-economic-reality-26547887.html

[52] https://www.herald.ie/opinion/andrew-lynch-and-all-this-is-about-rescuing-gormleys-career-27956997.html

same renewable energy framework. The reason why they weren't utilised is because the legal framework was bypassed.

1.9 'Bootleggers and Baptists' and 'evidence based decision making'

Indeed, the whole agenda of climate change is a classic case of what is recognised in economics as 'Bootleggers and Baptists':

- *Theories of regulation offer thought facilitating devices that may help to explain the functioning of government in a political economy. Among formal theories put forward in the 20th century are public interest, capture, special interest, and money for nothing. The Bootlegger and Baptist theory is based on the frequent observation of two distinct and different interest groups pursuing the same regulatory end. The name comes from experiences observed in regions of the US where religious groups oppose the Sunday sale of alcoholic beverages, a positioned welcomed by bootleggers, illicit sellers who welcome a wider market for their services. In the context of regulation generally, the "Baptists" are those who take moral high ground in the efforts to gain regulation, as with environmental groups. The "bootleggers" are those who gain monopoly rents when the Baptists successfully provide an output restriction, as when producers of clean energy see coal operations closed down.*[53]

Yet this concept is nothing new, for example "*Cui bono?*" is a Latin phrase from Cicero meaning 'to whom is it a benefit?' and is an adage still used to suggest a hidden motive or that the party responsible for something may not be who it appears at first to be. Indeed, Shakespeare also articulated the concept that "*politics makes strange bedfellows*".

It is undisputable that there are enormous sums of money to be made in the complete 'wild west' which is the Government sponsored rush to renewable energy. Equally so that those who are behind these projects are solely there for profit, but are facilitated by and supportive to those for whom 'climate change' has become a quasi-religious belief system. A belief system, which is characterised by an inability to rationally evaluate the natural world and is instead dominated by emotionally justified positions. That the "*road to hell is paved with good intentions*" has been articulated for centuries,[54] while the history of mankind is indelibly sculpted by the awful mess, which time and time again ideologies and mass hysteria events have left behind. Despite this as a society we fail to prioritise evidence based decision making and as a result sooner or later we are left to sit down once again to a banquet of consequences.

This 'evidence based decision making' is often defined by the following steps:[55]

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[53] Bootleggers and Baptists in the Theory of Regulation Bruce Yandle, Clemson University: https://www.researchgate.net/publication/267785761_Bootleggers_and_Baptists_in_the_Theory_of_Regulation

[54] Saint Bernard of Clairvaux (c. 1150), "*L'enfer est plein de bonnes volontés ou désirs" (hell is full of good wishes or desires)*.

[55] Rousseau, D. M., & Mccarthy, S. (2007). Educating Managers from an Evidence-Based Perspective. Source: Academy of Management Learning & Education, 6(1), 84–101. Plus: https://www.researchgate.net/publication/313967850_Evidence-Based_Management

1. *Use of the best available scientific findings.*

2. *Gathering and attending to organisational facts, indicators and metrics in a systematic fashion to increase their reliability and usefulness.*

3. *On-going use of critical, reflective judgment and decision aids in order to reduce bias and improve decision quality.*

4. *Consideration of ethical issues including the short- and long-term impact of decisions on stakeholders.*

The outstanding success we have seen in the last century in the field of medicine can be attributed to its use of evidence based decision making. While over time scientific enquiry helps convert 'unknowns' to 'knowns', such evidence is not always available to offer certainty to policy decisions, which are influenced by multiple stakeholders and their agendas.

1.10 Known knowns, known unknowns and unknown, unknowns

Donald Rumsfeld in 2002 in reply to a question on Iraqi weapons of mass destruction and terrorists put it so succulently with respect to the "*know knowns, known unknowns and unknown, unknowns*'. However, this does not detract from the fact that even before the 2003 invasion of Iraq, there were considerable 'known, knowns', not least as Hans Blix, the UN Chief Weapons Inspector put it:

- *Speaking on the anniversary of the United States' invasion of Iraq, originally declared as a pre-emptive strike against a madman ready to deploy weapons of mass destruction (WMDs), the man first charged with finding those weapons said that the U.S. government has "the same mind frame as the witch hunters of the past" — looking for evidence to support a foregone conclusion.*

- *"There were about 700 inspections, and in no case did we find weapons of mass destruction," said Hans Blix, the Swedish diplomat called out of retirement to serve as the United Nations' chief weapons inspector from 2000 to 2003; from 1981 to 1997 he headed the International Atomic Energy Agency.*[56]

As history shows, that war was pursued with the quasi-religious fervour to establish a 'new world order' – the 'Baptist' agenda. While many paid a high price, in particular the dead and wounded servicemen and civilians, there were also those who greatly profited, as at least $138 billion of US taxpayers' money was spent on private security, logistics and reconstruction contractors – the 'Bootlegger' element.[57] Did the 'Bootleggers' fund and promote the 'Baptists', as the classic 'Bootlegger, Baptist' theory would articulate? Well such links have been alleged.[58]

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[56] https://www.berkeley.edu/news/media/releases/2004/03/18_blix.shtml

[57] https://www.ft.com/content/7f435f04-8c05-11e2-b001-00144feabdc0

[58] For example:
https://www.texasmonthly.com/articles/did-dick-cheney-sink-halliburton-and-will-it-sink-him/

1.11 The 97% consensus

In considering the agenda of 'Catastrophic Anthropogenic (man made) Climate Change' there are in fact, as is discussed later in Section 2, very considerable 'known, knowns' in that; (i) the planet's weather is normal and; (ii) that carbon dioxide (CO_2) emissions from burning fossil fuels are simply not capable of causing catastrophic warming. Regardless of what consensus may appear to develop, such consensus or beliefs are not evidence and while consensus may well be politics, it is not science, which is inherently evidence based.[59]

For example, Einstein is portrayed as an older wise man, but he was young and unknown when he published his theory of relativity, challenging the Newtonian physics established for centuries. Some considered him an upstart and a 'scientific' book was published 'One Hundred Authors against Einstein'. Einstein's alleged reply was one would not need the word of a hundred scientists, just one fact, which no one had produced.

Furthermore, claims that 97% of scientists agree in 'Catastrophic Anthropogenic Climate Change' are profoundly absurd, given as to how difficult it is to get 97% of a group of humans to agree to anything. Not least a group of researchers into a highly complex issue related to subtle changes in the inherently highly variable weather.[60] That over time the climate changes in a cyclical manner is an undisputed concept, as is the gradual warming we have experienced in the last two centuries since the 'Little Ice Age'. That CO_2 emissions have the potential to lead to a limited amount of warming is also generally accepted by many in this field, but the general acceptance of these three concepts as being established, does not then in any automatic respects lead to a conclusion that there is an impending environmental catastrophe due to rapidly rising temperatures.

As is explained in Section 2, such a hypothesis was widely speculative from the beginning and with each passing year it is clearer as to how speculative it is. It is therefore a 'known, known' that 'Catastrophic Anthropogenic Climate Change solely exists as a highly speculative hypothesis and for which we have no evidence in our weather data to support it. For one to accept this speculative hypothesis is also to accept that the planet's climatic systems are at a level of severe instability, an instability not supported by the considerable knowledge we have of the past. Furthermore, this highly speculative hypothesis was widely criticised from its inception and with each passing year, as its projections rapidly diverge from the evidence in front of us, the criticisms and concerns in the scientific community grow louder.

[59] An excellent paper on this subject was presented by the famous author Michael Crichton at the Caltech lecture in 2003:
https://stephenschneider.stanford.edu/Publications/PDF_Papers/Crichton2003.pdf

[60] For some background as to the political activism behind this 97% claim, see for example:
https://www.scientificamerican.com/article/how-to-determine-the-scientific-consensus-on-global-warming/

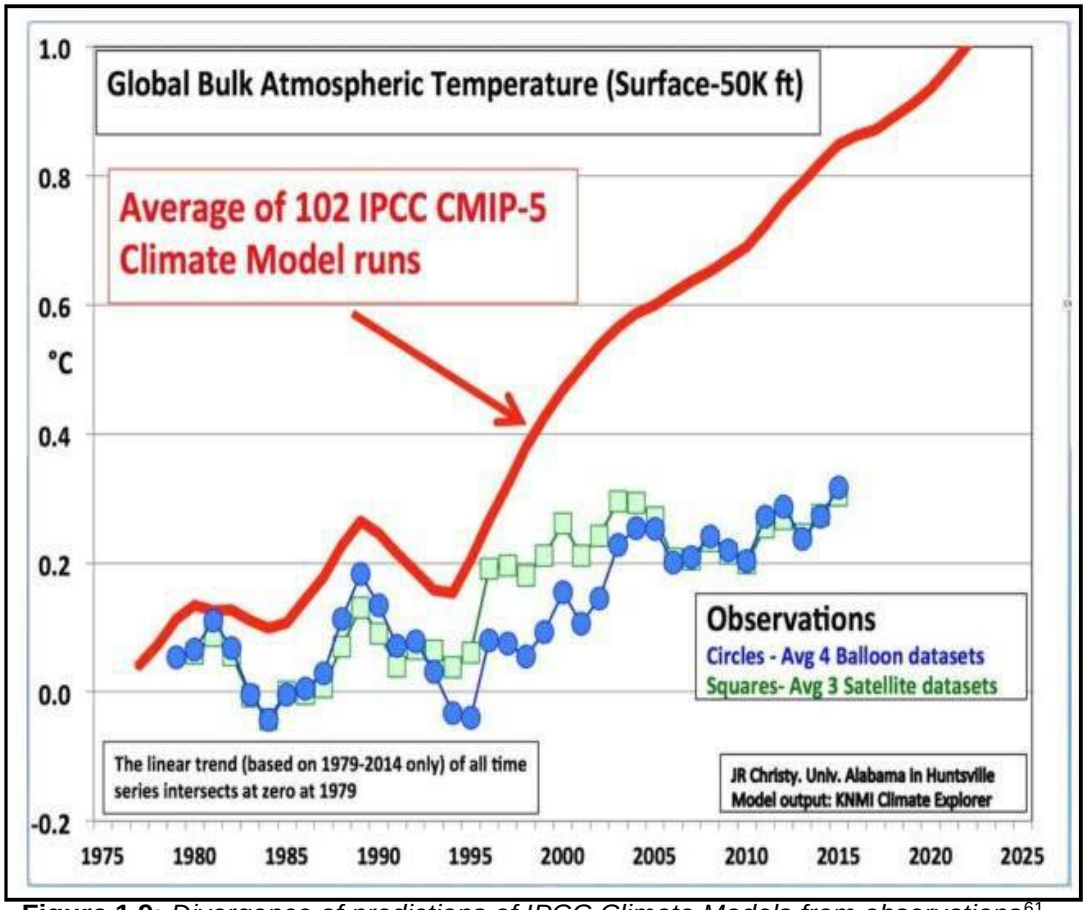

Figure 1.9: *Divergence of predictions of IPCC Climate Models from observations*[61]

1.12 The political ownership of the IPCC and the failure to address uncertainties

The UN's Intergovernmental Panel on Climate Change (IPCC) was established in 1988 on the basis of 'Catastrophic Anthropogenic Climate Change', i.e. that man's continued use of fossil fuels would lead to an environmental disaster. However, this was solely a political decision, which was taken before the scientific knowledge on the planet's climatic systems was at level of confidence, to either predict such a catastrophe would occur or robustness enough to support major policy decisions in this area. Indeed, at that time, the area of climate studies was very much a niche area with a limited amount of knowledge. However, the IPCC's name as an Intergovernmental Panel highlights as to how it was from the start a political creation.

This political ownership is clearly evident when one compares the 'Summary for Policymakers' in the reports of the IPCC, with the detailed technical analysis within. This analysis, to put it mildly, is characterised by an absence of a detailed understanding of the natural variability and cycles, which occur with the planet's dynamics. Meteorological knowledge can only extent to forecasting the weather eight to ten days ahead, yet the summary for policy makers can make definite predictions about the climate at the end of the century and what we should be doing about it at enormous cost.

[61] https://tropical.colostate.edu/media/sites/111/2018/01/Bill-Gray-Climate-Change.pdf

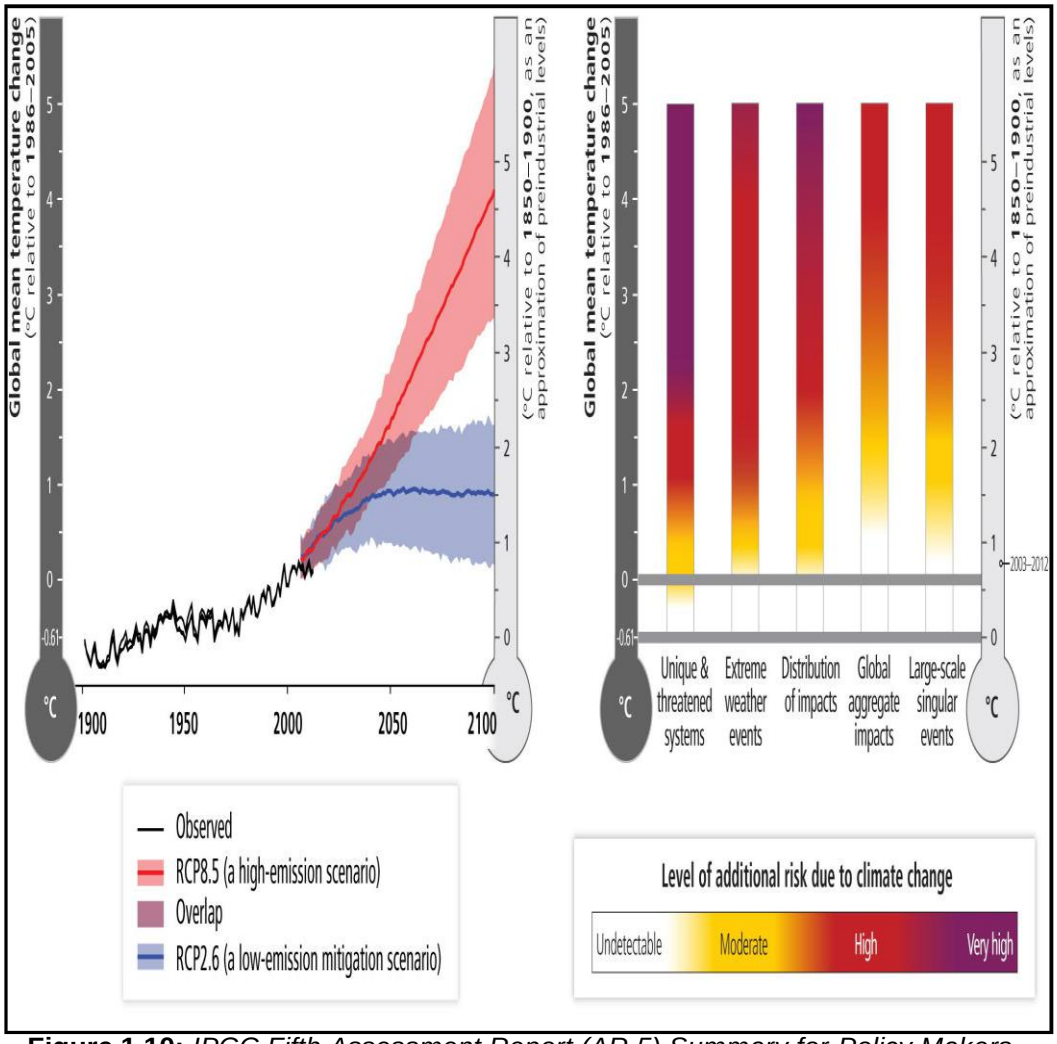

Figure 1.10: *IPCC Fifth Assessment Report (AR.5) Summary for Policy Makers-Climate Change 2014 Impacts, Adaptions and Vulnerability*[62]

However, the same IPCC Fifth Assessment Report when reviewed in more detail with respect to 'Uncertainties' provides the following:[63]

- *FAQ 1.1 | If Understanding of the Climate System Has Increased, Why Hasn't the Range of Temperature Projections Been Reduced?*

- *The models used to calculate the IPCC's temperature projections agree on the direction of future global change, but the projected size of those changes cannot be precisely predicted. Future greenhouse gas (GHG) emission rates could take any one of many possible trajectories, and some underlying physical processes are not yet completely understood, making them difficult to model. Those uncertainties, combined with natural year-to-year climate variability, produce an 'uncertainty range' in temperature projections*

[62] https://www.ipcc.ch/site/assets/uploads/2018/02/ar5_wgII_spm_en.pdf

[63] http://www.climatechange2013.org/images/report/WG1AR5_FAQbrochure_FINAL.pdf

To reiterate the position previously articulated, it is not disputed that there is a potential for some limited warming due to increased use of fossil fuels, but that does not most certainly lead to an automatic conclusion that that temperatures will rise rapidly leading to a catastrophic situation. Not only is the IPCC not in a position to forecast the projected change in temperatures, the details as to why being documented in the following Section 2, but as Figure 1.9 documents, their models on which their whole output is based are diverging rapidly from 'mother nature', a 'mother nature' whose natural variability and responses they clearly do not understand.

Hans Van Storch a Professor at the Meteorological Institute of the University of Hamburg and a prominent German climate researcher highlighted to the influential Der Spiegel magazine in 2013:[64]

- *SPIEGEL: Just since the turn of the millennium, humanity has emitted another 400 billion metric tons of CO_2 into the atmosphere, yet temperatures haven't risen in nearly 15 years. What can explain this?*

- *Storch: So far, no one has been able to provide a compelling answer to why climate change seems to be taking a break. We're facing a puzzle. Recent CO_2 emissions have actually risen even more steeply than we feared. As a result, according to most climate models, we should have seen temperatures rise by around 0.25 degrees Celsius (0.45 degrees Fahrenheit) over the past 10 years. That hasn't happened. In fact, the increase over the last 15 years was just 0.06 degrees Celsius (0.11 degrees Fahrenheit) -- a value very close to zero. This is a serious scientific problem that the Intergovernmental Panel on Climate Change (IPCC) will have to confront when it presents its next Assessment Report late next year.*

Indeed, an ever increasing number of scientists in such fields as meteorological research, atmospheric physics, energy systems and economic analysis, many of whom at one time worked as technical contributors to the IPCC, have turned into fierce critics pointing out how politicised and inaccurate its outputs are. Yet despite the increasing divergence of the models on which it makes its predictions from actual observations, the IPCC's political rhetoric just gets shriller and shriller.

1.13 Politics can be diverse with diverse interests

Naturally this is a totally unacceptable situation, given the enormous costs and restrictions on society expected to be thrown at this alleged problem, a conclusion which is actively recognised in many countries. For example, China was calling at the 2011 Durban climate summit for a review of climate change science by 2015, as a precondition for entering any possible negotiated agreement post 2020.[65] As the Chinese Academy of Science was summarising it at that time:[66]

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[64] https://www.spiegel.de/international/world/interview-hans-von-storch-on-problems-with-climate-change-models-a-906721.html

[65] https://bellona.org/news/climate-change/international-climate-conferences/2011-12-chinese-delegation-to-durban-lays-out-conditions-under-which-it-will-cut-emissions

[66] http://www.springerlink.com/content/w342k240350n4564/fulltext.pdf and http://scienceandpublicpolicy.org/images/stories/papers/reprint/human_induced.pdf

- *In recent decades, there have been a number of debates on climate warming and its driving forces. Based on an extensive literature review, we suggest that (1) climate warming occurs with great uncertainty in the magnitude of the temperature increase; (2) both human activities and natural forces contribute to climate change, but their relative contributions are difficult to quantify; and (3) the dominant role of the increase in the atmospheric concentration of greenhouse gases (including CO_2) in the global warming claimed by the Intergovernmental Panel on Climate Change (IPCC) is questioned by the scientific communities because of large uncertainties in the mechanisms of natural factors and anthropogenic activities and in the sources of the increased atmospheric CO_2 concentration. More efforts should be made in order to clarify these uncertainties.*

The Paris Agreement (Climate Treaty) of 2016[67] solely requires "*all Parties to put forward their best efforts through nationally determined contributions (NDCs) and to strengthen these efforts in the years ahead".* It is both interesting and informative to dip into the NDCs of individual Parties (countries).[68] For example that of China, which can be summarised by the following bullet points:[69]

- *To achieve the peaking of carbon dioxide emissions around 2030 and making best efforts to peak early;*
- *To lower carbon dioxide emissions per unit of GDP by 60% to 65% from the 2005 level;*
- *To increase the share of non-fossil fuels in primary energy consumption to around 20%; and*
- *To increase the forest stock volume by around 4.5 billion cubic meters on the 2005 level.*

Which can be interpreted as; (i) we will continue to increase our use of fossil fuels as our economy continues to grow up to around 2030; (ii) as we modernise and become more efficient we expect this to be reflected in our carbon intensity; (iii) as a major importer of fossil fuels we will continue to strive for diversification, such as in our successful and ambitious nuclear programme[70] and; (iv) we will reverse the currently unacceptable rate of deforestation, which is currently leading to desertification.[71] In essence China ensured it offended nobody by ratifying this Paris Treaty, but China also ensured that in practice it would not have to adopt any measures, which would compromise its continued development.

India's NDC has similar objectives as the above in that as India modernises its economy it will become more energy efficient. However, India made it clear in that it is a developing economy and it will continue that essential development:[72]

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[67] https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

[68] https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx

[69] https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/China%20First/China%27s%20First%20NDC%20Submission.pdf

[70] https://www.reuters.com/article/us-china-nuclearpower-hualong/china-goes-all-in-on-home-grown-tech-in-push-for-nuclear-dominance-idUSKCN1RT0C0

[71] http://factsanddetails.com/china/cat10/sub66/item389.html

[72] https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/India%20First/INDIA%20INDC%20TO%20UNFCCC.pdf

- *It is clarified that India's INDC do not bind it to any sector specific mitigation obligation or action, including in agriculture sector. India's goal is to reduce overall emission intensity and improve energy efficiency of its economy over time and at the same time protecting the vulnerable sectors of economy and segments of our society.*

That the Trump administration has withdrawn from the Paris Agreement is well known, what is regretfully less discussed is his reasoning for doing so:[73]

- *"….. close to $3 trillion in lost GDP and 6.5 million industrial jobs, while households would have $7,000 less income…"*

- "*Even if the Paris Agreement were implemented in full, with total compliance from all nations, it is estimated it would only produce a two-tenths of one degree — think of that; this much — Celsius reduction in global temperature by the year 2100. Tiny, tiny amount. In fact, 14 days of carbon emissions from China alone would wipe out the gains from America — and this is an incredible statistic — would totally wipe out the gains from America's expected reductions in the year 2030….*"

- "*There are serious legal and constitutional issues as well. Foreign leaders in Europe, Asia, and across the world should not have more to say with respect to the U.S. economy than our own citizens and their elected representatives. Thus, our withdrawal from the agreement represents a reassertion of America's sovereignty*".

Note: The US Constitution provides that the president "*shall have Power, by and with the Advice and Consent of the Senate, to make Treaties, provided two-thirds of the Senators present concur*". The Obama administration signed the Paris Agreement and accepted it by executive order without Senate agreement. A position adopted, which was both legally and politically controversial for such a Treaty, with such huge implications.

For those that rationalise their decision-making rather than default to the emotional attraction of the quasi-religious argument, the above logic of the Trump administration is entirely reasonable and logical. If it could be demonstrated that what was articulated above was widely inaccurate, then its reasoning could be justifiably challenged, but there is no such evidence, as is discussed in the following Section 2, of any inaccuracies in the above. Yet regretfully we have reached a position in many quarters, where attacking the man rather than the logic suffices, which regretfully is the classic trait of the out and out Baptist preacher.

Furthermore, whether we like it or not, it is indisputable that over 70% of the earth's population has no intention of doing anything about reducing fossil fuel emissions, in fact they very much intend to increase them. Not only is the EU's official position on reducing climate change an increasingly unilateral decision, but it is also one which is generating increasing discontent within the general population of the EU.[74]

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[73] https://www.whitehouse.gov/briefings-statements/statement-president-trump-paris-climate-accord/

[74] For example the successful campaign of second largest party from the April 2019 Finnish elections – climate change policies are elitist and excessively expensive:

1.14 Political activism rather than impartial assessment

Hans Van Storch in the same Der Spiegel interview in 2013 highlighted:

- *Unfortunately, some scientists behave like preachers, delivering sermons to people. What this approach ignores is the fact that there are many threats in our world that must be weighed against one another. If I'm driving my car and find myself speeding toward an obstacle, I can't simple yank the wheel to the side without first checking to see if I'll instead be driving straight into a crowd of people. Climate researchers cannot and should not take this process of weighing different factors out of the hands of politics and society.*

President Trump has also pointed out he does not deny climate change, but when pressed "*about the scientists who say it's worse than ever*". He has answered: "*You'd have to show me the scientists because they have a very big political agenda*".[75]

Again, this simply reflects the position in that what is increasingly promoted as climate science is often barely concealed 'political advocacy'. It is the function of the professional scientist to inform, inclusive of the inherent uncertainties, but decision making is inherently a trade-off between many requirements, some conflicting, and should be left to society at large and to the democratically elected representatives of that society in particular. You cannot simultaneously be a competent impartial advisor and a political campaigner – they are mutually exclusive.

The experience with COVID in 2020 has mirrored this, citizens' civil liberties were effectively suspended on so called 'scientific' justifications, which were tenuous. The net resulted is that society is left paying a very high cost, for what is clearly little gain and in a manner in which it was excluded from making personal decisions about the level of risk it would accept.

Since 2003 the US has had detailed guidance related to the conduct of Regulatory Impact Analysis, which time and time again stresses the importance of uncertainties and how the strengths of the analysis should be delineated along with any uncertainties about its conclusions. As this guidance goes on to explain:[76]

- *In some cases, the level of scientific uncertainty may be so large that you can only present discrete alternative scenarios without assessing the relative likelihood of each scenario quantitatively. For instance, in assessing the potential outcomes of an environmental effect, there may be a limited number of scientific studies with strongly divergent results. In such cases, you might present results from a range of plausible scenarios, together with any available information that might help in qualitatively determining which scenario is most likely to occur.*

- *When uncertainty has significant effects on the final conclusion about net benefits, your agency should consider additional research prior to rulemaking. The costs of being wrong may outweigh the benefits of a faster decision.*

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https://www.nytimes.com/2019/04/14/world/europe/finland-election-climate.html

[75] https://www.ecowatch.com/trump-climate-scientists-political-agenda-2612537150.html

[76] https://georgewbush-whitehouse.archives.gov/omb/circulars/a004/a-4.html

Given all of the above, is it in anyway surprising that the Trump Administration in February 2019 announced its intention "*to establish create an ad hoc group of select federal scientists to reassess the government's analysis of climate science and counter its conclusions that the continued burning of fossil fuels is harming the planet*".[77] It is after all entirely reasonable that publically funded climate science, which is inherently characterised by enormous uncertainties and which demands that near unlimited sums of money and resources to be dedicated to it, is subjected to scrutiny by others, who may not necessarily share the same viewpoints. Professional engineers for example are used to their designs being reviewed by others before they go to construction.

Indeed, science fundamentally works on the basis that a hypothesis is presented; this is then challenged as the evidence emerges to either approve or disapprove the hypothesis. This is the core of the scientific method, in which from the results of subsequent experimentations, a deduction is made as to whether the hypothesis is presumably true or false. Fundamentally, for acceptance of a hypothesis, it is necessary to falsify the null hypothesis, which in decision-making equates to the 'zero option'. Hence, the adherence to blind placebo trials in medicine. Equally one could refer to the hypothesis that renewable energy reduces CO_2 emissions, the EU with religious fervour pursued this objective, and the USA did not. Both obtained the same emissions reductions.

Catastrophic Anthropogenic Climate Change is nothing, but one of many potentially valid scientific hypotheses related to climate. It is also one for which, as the following Section 2 documents, there is an increasing divergence between outputs of the computer models representing this catastrophic hypothesis, and the evidence of the real world around us. *Nullius in verba* (Latin for "*on the word of no one*" or "*take nobody's word for it*") is the motto of the Royal Society, which was founded in England in 1660 and is the oldest national scientific institution in the world.

We should not forget these core scientific principles and recognise that science may well have questions for which there may not be answers for in our lifetime. There are reasons these days to lose faith in the integrity of science, but one should not lose faith in the scientific method. Political decision-making can value either 'science' or the 'scientific method'. Religion on the other hand is one which has all the answers and for which questions are not acceptable.

People's emotional outbursts are not accepted as evidence to support the making of judgements in the Court of Law and for good reason, if they were we would be back to the situation of the 'witch trials'. That an ex-President of Ireland, former UN High Commissioner for Human Rights and climate change campaigner Mary Robinson would come out in March 2019 with official statement that: *Denial of climate change is not just ignorant, but "malign and evil"*,[78] clearly demonstrates, as to how this climate change agenda is increasingly being dominated by those, who demonstrate characteristics of intolerant Baptist preachers, rather than rather than rational and informed analysis.

[77] https://www.pressherald.com/2019/02/24/white-house-to-pick-scientists-to-reassess-federal-climate-report/

[78] https://www.theguardian.com/environment/2019/mar/26/climate-change-denial-is-evil-says-mary-robinson

1.15 Group think and preaching replace competency and transparency

Warren Buffet is probably the world's most famous and successful investor and is renowned for his witty quotes, such as:

- "*Risk comes from not knowing what you are doing*" and;
- "*When the tide goes out a lot of people are left looking naked*"

The above could quite rightly be applied to 'Official Ireland' and indeed the EU administration, with respect to the chronic mismanagement of fiscal policy and the financial sector, which lead to the financial crash in 2008. Despite the economic indicators in the build-up to the crash demonstrating a grossly overheated situation, the litany was repeated over and over again by 'Official Ireland', in that we were heading for a 'soft landing'. This was advice that many in the general public accepted in their subsequent decision making and which led to many of these suffering increased hardship as a result.

When Professor Morgan Kelly of University College Dublin, a specialist in economic history, stated in 2006 that the economy was so overheated that a crash with house prices falling by up to 50% was the only possible outcome; it prompted the then Taoiseach (Prime Minister) Bertie Aherne to state that those "*cribbing and moaning*" about spiralling property prices should "*commit suicide*".[79] This demonstrate not only a basic intolerance to others' views that did not suit one's own agenda, but also an ingrained cultural antagonism to accepting an analysis, which did not suit Official Ireland's politics.

It was therefore not surprising when the Finnish economist Nyberg wrote the official report into the financial collapse;[80] he attributed the 'root cause' to institutionalised 'Groupthink' defined as:

- *Groupthink occurs when people adapt to the beliefs and views of others without real intellectual conviction. A consensus forms without serious consideration of consequences or alternatives, often under overt or imaginary social pressure. Recent studies indicate that tendencies to groupthink may be both stronger and more common than previously thought.*

One would think that we have learnt from this, but there is zero indication that either 'Official Ireland' or the EU administration has.

The Irish Environmental Protection Agency (EPA) published a press release in October 2018 entitled: *"Relentless implementation of policy needed to combat effects of climate extremes*".[81]

- *"We have, by any measure, experienced an extraordinary year where nature reminded us who is in charge. With our changing climate, the confident predictions are that we can expect extreme events at greater frequency into*

[79] https://www.irishtimes.com/business/economy/the-day-the-banks-stood-still-counting-the-cost-of-the-crash-a-decade-later-1.3642474

[80] http://www.bankinginquiry.gov.ie/Documents/Misjuding%20Risk%20-%20Causes%20of%20the%20Systemic%20Banking%20Crisis%20in%20Ireland.pdf

[81] http://www.epa.ie/newsandevents/news/pressreleases2018/name,64793,en.html

the future", said Laura Burke, Director General of the EPA, speaking at the annual 'Environment Ireland' conference.

It seems she listed the following at that conference to justify this position of 'Official Ireland':[82]

- *September 2017 – Storm Aileen*
- *October 2017 – Storm Brian & ex-Hurricane Ophelia*
- *December 2017 – Storm Dylan & Storm Caroline*
- *January 2018 – More rain in Malin Head than at any time since 1885*
- *March 2018 – The Big Snow & Storm Emma*
- *April 2018 – Wettest ever in many locations*
- *May, June & July 2018 – Prolonged drought and heatwave*

Are these weather occurrences of relevance? Like many of the now 'older' generation in Ireland I resent the naming and hyping of storms and such like as 'media events', where in the past it was simply just a windy or stormy day. However, data doesn't lie and returning to the same CSO meteorological database as used for Figure 1.1, it is very easy to generate the following line graph below in Figure 1.11.

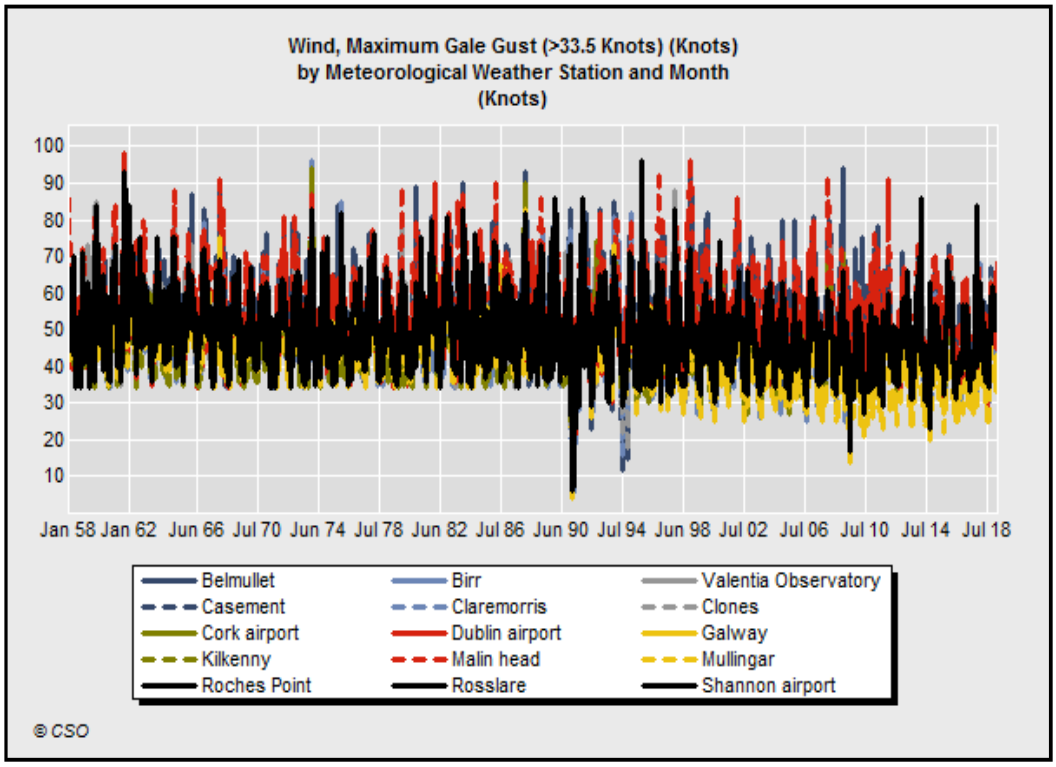

Figure 1.11: *Graph generated from Met Eireann meteorological data (Jan 1958 to March 2019) on the CSO website*[83]

[82] https://www.irishtimes.com/news/environment/recent-storms-have-cost-billions-and-severely-tested-ireland-says-epa-1.3651507

[83] https://www.cso.ie/px/pxeirestat/Statire/SelectVarVal/Define.asp?maintable=MTM04&PLanguage=0

Not only was 2018 nothing special, but if there is a trend, then it is if anything getting somewhat less windy. Furthermore, Met Eireann estimates that on average an 'Ex-tropical storm' will hit Irish shores every three years. Ex-Hurricane Ophelia was quite strong, but it caused far less damage than Ex-Hurricane Charlie in 1986[84] and Ex-Hurricane Debbie in 1961.[85] Indeed, "Oíche na Gaoithe Móire", the night of the big wind in 1839, was the most devastating storm ever to hit Ireland causing enormous damage.[86] One can only conclude that nothing abnormal is currently occurring with respect to the wind conditions Ireland is experiencing.

It is also possible with the same CSO website to generate a line graph of rainfall. As can be seen from Figure 1.12 below, it is normally wet in Ireland; while there can be months when it is very wet. This is not surprising in that a number of intense low pressures can move in rapidly one after another from the Atlantic. So again, nothing unusual is happening.

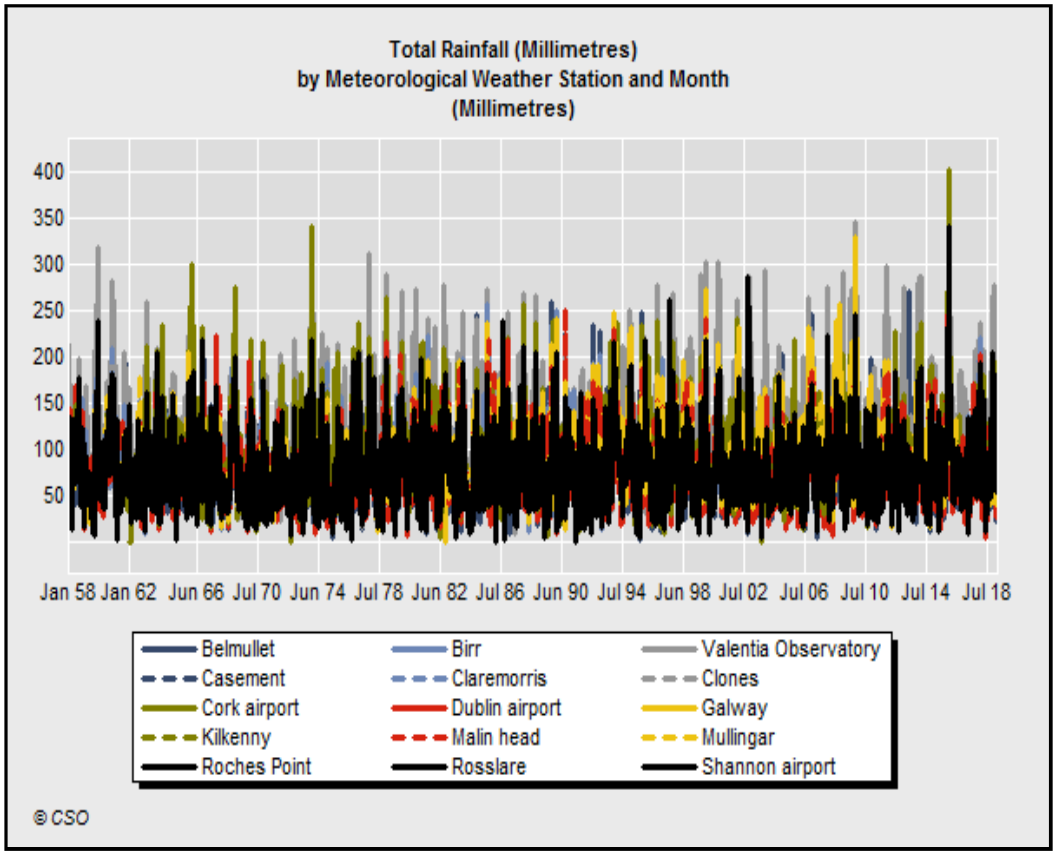

Figure 1.12: *Graph generated from Met Eireann meteorological data (Jan 1958 to March 2019) on the CSO website*[87]

[84] https://www.irishtimes.com/news/ireland/irish-news/hurricane-charley-storm-that-travelled-from-the-us-to-ireland-1.2910412

[85] https://www.irishtimes.com/news/ireland/irish-news/hurricane-debbie-high-winds-death-and-destruction-in-1961-1.3256985

[86] http://www.irishcultureandcustoms.com/ACalend/BigWind.html

[87] https://www.cso.ie/px/pxeirestat/Statire/SelectVarVal/Define.asp?maintable=MTM01&PLanguage=0

As regards warm summers, once in a while we get lucky, such as those of us able to remember, not only the glorious summer of 2018, but those of 1974 and 1976 as well. We also get cold outbreaks from time to time, as explained further in Section 2 and Section 2.12 in particular. 2018 was one such outbreak, while 2010, 1982, 1963 and 1947 all had very severe conditions, which extended for considerably longer than the cold snap in 2018.

One can only conclude, is this all that 'Official Ireland' can provide to justify the billions of Euro, which we are now required, year on year, to fork out on this agenda, with even more billions of Euro to be added to that bill? It also reflects a position which is increasingly disturbing. This was after all the most senior environmental official in the State, who is expected to provide sound impartial advice to inform political decision making, but is clearly instead engaged in blatant scare mongering and political advocacy.

The United Nations Economic Commission for Europe's (UNECE) Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters[88] requires that environmental considerations be taken into Government decision-making. Furthermore, public authorities are required to possess and update environmental information, which is relative to their decision making and ensure that it is transparent. This latter requirement is to found transcribed into Directive 2003/4/EC on environmental information and the implementing Irish regulations,[89] namely such environmental information has to be "*up-to-date, accurate and comparable*".

Sadly, an abject failure to comply with this has become the norm. The research reports on the EPA's website related to climate change all have a disclaimer in the cover pages. While their content fundamentally derives from the output of the computer models, which as the above and the following Section 2 point out, are so deeply flawed, as to be unable to reflect the conditions, which prevail on the planet. However, these chronic uncertainties are never explained to the public.

Engineering professionals do not put disclaimers on their designs before they go to construction. They are liable if such designs fail or cause an accident; as a result they know they could quickly find themselves in a Court of Law, in which professional competency is assumed as given. This situation is no different for a range of other professions, such as medicine. However, it clearly doesn't seem to apply to those who are responsible for promoting and developing environmental policies and programmes, such policies and programmes which are clearly responsible for huge costs for no obvious gain.

This situation is now rampant in 'Official Ireland' and the EU Administration. In 2012, the Department of the Environment, Community and Local Government conducted in March 2012 a Public Consultation on Climate Policy and Legislation, which hyperlinked to an EU Commission webpage on Climate Action, in relation to a roadmap to a low carbon economy by 2050, which stated:

[88] https://www.unece.org/env/pp/introduction.html

[89] https://www.dccae.gov.ie/en-ie/about-us/compliance/access-to-information-on-the-environment-(aie)/aie-legislation/Pages/AIE-Legislation.aspx

- *"Science tells us that all developed countries would need to reduce emissions by 80-95% in order to have a fair chance of keeping global warming below 2°C".*

This clearly was the sole justification for the draconian measures being promoted, but what was supporting this statement, where did it come from? The UNECE 'Aarhus Convention: An Implementation Guide'[90] defines that transparency "*means that the public can clearly follow the path of environmental information, understanding its origin, the criteria that govern its collection, holding and dissemination, and how it can be obtained*". As previously, highlighted Member States have to ensure that information on the environment is "*up-to-date, accurate and comparable*". An 'Access to Information on the Environment' request was made by this author and two others related to the above statement and three other aspects of the consultation. There was a point blank refusal to answer it.

It was appealed to the Commissioner for Environmental Information, who subsequently took more than a year to deal with the appeal. The appeal was rejected, on the basis of being "*manifestly unreasonable*".[91] In particular a misuse of rights as the appellant:

- "*was seeking to challenge the Department's reliance on the mandatory greenhouse gas mitigation targets underlying the national climate policy and legislation development programme and to raise questions about the Department's intention to take "due account" of "all" submissions made in the context of the public consultation exercise being carried out at the time his request was made"*.

Quite an amazing conclusion, as the whole purpose of the access to information pillar of the Aarhus Convention is that the public can gain access to information, which they then may choose to utilise in the third pillar of the Convention, namely access to justice. A conclusion which is also completely at variance with the detailed guidance in the UNECE 'Aarhus Convention: An Implementation Guide'. However, a further appeal to the High Court was prohibitively expensive, but as the Commissioner had taken so long to deal with the issue, a similar access to information request was made to the EU Commission addressing the statement above. They replied reasonably promptly, and maybe one should not be too surprised at the answer. Namely, they had reached political consensus on it at the Copenhagen and Cancun Climate Summits (2009 and 2010 respectively) and then adopted it at their Council meeting in 2011.[92]

There never was any evidence based documentation available to support this, while year after year the weather continues to be normal. It is also deeply worrying to see the institutionalised lack of competency on the subject matter, which is now so completely ingrained, as all that is occurring is the implementation of arbitrarily agreed political targets. The Chair of the An Bord Pleanala is a political appointee, who has enormous discretionary powers in terms of planning decisions around the

[90] http://www.unece.org/index.php?id=35869

[91] https://www.ocei.ie/decisions/dCEI_12_0005-Mr-Pat-Swords-and-the-/

[92] See point 15: https://ec.europa.eu/research/era/docs/en/brussels-european-council-4-february-2011-presidency-conclusions.pdf

State. The current Chair is Dave Walsh and for which the Bord Pleanala website documents:[93]

- *Dave headed up the Department's Environment and Climate Division, leading Ireland's and the EU negotiations on climate change during Ireland's 2013 EU Presidency which ultimately led to the adoption of the Paris UN Climate Change Agreement in 2015.*

- *A graduate of Trinity College with a Single Honours BA in the Classics (Ancient Greek and Latin), Dave also has a Higher Diploma in Education (TCD) and a Ms.C in Economic Policy (TCD/IPA).*

One can quite rightly question, as to if he had any recognisable competency in matters related to the weather and hence climate. While that is not to unfairly belittle the individual, the core of the issue is that there is no evidence that anybody else there had either. Simply put, no documentation exists as to how the problem was quantified, namely as to why our weather is abnormal, because it clearly isn't. No documentation exists, as to how these measures are actually going to be effective and as to what quantified benefits they will deliver.

Others in academia have analysed what these measures will cost in order to implement this EU strategy.[94] The GDP of the EU is expected to be $17,900 billion in 2019,[95] which is down from its record high of $19,137 billion in 2008. These climate change measures are estimated by 2050 to lead to a reduction in the order of 5 to 6 % of GDP, which equates to some $1,050 billion per year, which give or take the level of accuracy in the estimation, is about a trillion Euros (thousand billion) per year. Alternatively given that the EU population was 508 million, this equates to an annual contribution by each man, woman and child of €2,000.

You would think for this, which is a decision already made and being relentlessly implementing, that there would be a degree of analysis to justify it and as to how it is being optimised in its implementation. Well you thought wrong.

As for the competent authority for matters related to the weather in this country, namely Met Eireann, they are not pushing this agenda at all. They just provide scientific analysis of the state of the weather, which is summarised each month into a climatic statement, each of which goes to show that the weather is simply normal.[96]

Prof. J. Ray Bates obtained his PhD from the Massachusetts Institute of Technology and has had a distinguished career:[97]

- Adjunct Professor of Meteorology, University College Dublin, 2004-
- Prof. of Meteorology, Niels Bohr Institute, University of Copenhagen, 1995-2004.

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[93] http://www.pleanala.ie/about/members.htm

[94] https://www.worldscientific.com/doi/pdf/10.1142/S2010007813400010

[95] https://tradingeconomics.com/european-union/gdp

[96] For example for March 2019: https://www.met.ie/climate-statement-for-march-2019

[97] http://www.raybates.net/

- Senior Scientist and Branch Head, Lab. For Atmospheres, NASA Goddard Space Flight Center, Greenbelt, Maryland, 1987-1995.
- Irish Meteorological Service (now Met Éireann), 1963-1987. Positions held: Forecaster, Head of Research Division, Assistant Director.

He has served as an expert reviewer of the IPCC's earlier report, but has like other similar scientists become a major and public critic of its work, such as in his recent publication relating to the inaccuracies of the 2018 IPCC SR1.5 report and its deficiencies.[98] As the introduction to his publication states:

- *The recent special report of the Intergovernmental Panel on Climate Change, known as SR1.5 goes far beyond all its previous publications in raising the level of alarm about climate change and in calling for drastic action to combat it. The report adopts the standpoint that the essential aspects of climate science are settled and then conflates what it sees as a necessary policy response with ethical issues of sustainable development, poverty eradication and reducing inequalities.*

- *The report calls for radical changes in the world's economy to achieve zero carbon emissions by mid-century. Given the extremely costly and highly disruptive changes this course of action would entail, the rigour of the underlying scientific case should be beyond question. Here, some central aspects of SR1.5 are examined to see whether the report exhibits a level of scientific rigour commensurate with the scale of its prescribed course of action. The conclusion, based on the evidence, is that it does not.*

With each passing year, it is clearer in how speculative and alarmist the IPCC's claims are, the reasons why being discussed further in Section 2 of this document. Yet the political rhetoric just gets shriller, as more and more, who should know better, clamber on the soap box of moral superiority and engage in sanctimonious preaching at others.

Despite this, two things are happening and there are no reasons why they will not continue to happen. Namely, (i) the weather continues to be normal, while (ii) more and more countries continue to do nothing about reducing emissions. At the December 2018 COP24 IPCC climate conference in Katowice, Poland this SR1.5 report warned that *"Limiting global warming to 1.5°C would require rapid, far-reaching and unprecedented changes in all aspects of society."*[99]

- *"The United States was willing to note the report and express appreciation to the scientists who developed it, but not to welcome it, as that would denote endorsement of the report," the US State Department said, revealing the underlying issue behind elevating acknowledgement of the IPCC's report. "As we have made clear in the IPCC and other bodies, the United States has not endorsed the findings of the report."*

Russia, Saudi Arabia and Kuwait all joined with the USA, as they all had major reservations over the quality of the 'scientific' work presented.

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[98] https://www.thegwpf.org/content/uploads/2019/01/Bates-2018b.pdf

[99] https://cleantechnica.com/2018/12/10/cop24-begins-to-devolve-as-key-countries-block-ipcc-1-5-report/

Sadly, Prof Ray Bates is both scorned by what considers itself to be an environmental movement in Ireland,[100] which after all is inherently righteous and doesn't have to provide analysis of the weather's systems, and also 'Official Ireland'. History repeats itself, as there is an uncanny similarity to the situation back in 2006 with Professor Morgan Kelly of UCD.

1.16 Preachers and bootleggers operating behind closed doors

That the general public have never been informed of what these measures are costing, on what basis they are justified, what alternatives have been considered, what are the impacts and mitigation measures, etc., is because the legal procedures requiring these to be completed, and the participation of the public to be engaged in the decision-making, have been bypassed. Since 2005, Ireland like the USA has a requirement for Regulatory Impact Analysis including detailed cost benefit assessments and public participation, before major regulations are adopted. The latter also referring to reaching agreement on draft EU legislation. Sadly these Regulatory Impact Analyses just don't get done.

The Organization for Economic Cooperation and Development (OECD) evolved out of the post war period and includes both European and North American countries, Ireland being a member. In 1995, the OECD adopted its Legal Instrument 0278 "Recommendation of the Council on Improving the Quality of Government Regulation".[101] This very readable document included a ten-point checklist, expanding on the ten fundamental questions listed below.

- *Question No. 1: Is the Problem Correctly Defined?*
- *Question No. 2: Is Government Action Justified?*
- *Question No. 3: Is Regulation the Best Form of Government Action?*
- *Question No. 4: Is there a Legal Basis for Regulation?*
- *Question No. 5: What is the Appropriate Level (or Levels) of Government to Take Action?*
- *Question No. 6: Do the Benefits of Regulation Justify the Costs?*
- *Question No. 7: Is the Distribution of Effects Across Society Transparent?*
- *Question No. 8: Is the Regulation Clear, Consistent, Comprehensible, and Accessible to Users?*
- *Question No. 9: Have All Interested Parties had the Opportunity to Present Their Views?*
- *Question No. 10: How will Compliance be Achieved?*

The systematic use of Regulatory Impact Analysis (RIA) is a key part of that checklist. Unfortunately both the EU and Ireland ignore it. We also have a legal requirement for Strategic Environmental Assessment of plans and programmes, such that the justifications and alternatives can be assessed, along with the impacts, mitigation measures and monitoring for unforeseen environmental impacts. These just don't get completed either.

The EU simply adopted a political target for 20% renewable energy by 2020. As it had failed to evaluate, what exactly was to be built in each Member State, where it

[100] https://www.thetimes.co.uk/article/retired-ucd-professor-told-to-weather-climate-contrarian-jibe-b6mfmnlw3

[101] https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0278

was to be built, what its costs and benefits would be, what were the alternatives to the programme, etc., it therefore reached the position that this 20% renewable energy target had to be implemented in the following manner. As described in Recital 15 of the 2009/28/EC Directive.[102]

- *The starting point, the renewable energy potential and the energy mix of each Member State vary. It is therefore necessary to translate the Community 20 % target into individual targets for each Member State, with due regard to a fair and adequate allocation taking account of Member States' different starting points and potentials, including the existing level of energy from renewable sources and the energy mix. It is appropriate to do this by sharing the required total increase in the use of energy from renewable sources between Member States on the basis of an equal increase in each Member State's share weighted by their GDP, modulated to reflect their starting points, and by accounting in terms of gross final consumption of energy, with account being taken of Member States' past efforts with regard to the use of energy from renewable sources.*

In other words, the 20% renewable energy target was 'dished out' to the Member States based on what level of renewable energy resources they already had and a 'fudge factor' based on GDP. The Irish Republic got a 16% target and the UK 15%, while Austria with considerable hydro resources got double that at 34%. This 2009/28/EC Directive on 20% renewable energy was adopted on the 23rd April 2009, by the 30th June 2009 the Commission had to adopt a template for the National Renewable Energy Action Plans (NREAPs) and these in turn had to be completed, adopted by the Member States and notified to the Commission by the 30th June 2010.

As regards what was actually in the NREAPs and they are an awful disjointed and rambling document to read, the core issue was to be found right at the end of the NREAP template.[103]

5.3. Assessment of the impacts (Optional)
Table 13
Estimated costs and benefits of the renewable energy policy support measures

Measure	*Expected renewable energy use (ktoe)*	*Expected cost (in EUR) — indicate time frame*	*Expected GHG reduction by gas (t/year)*	*Expected job creation*

Nineteen of the Member States left this completely blank, the Irish NREAP going from Section 5.2 direct to Section 5.4. The other Member States provided little or no analysis. So all this renewable Directive does is deliver a politically agreed target, the costs, impacts and benefits of which are completely unknown.

[102] http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32009L0028

[103] http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32009D0548

The fact that the whole manner in which this Directive was implemented through the NREAPs was a complete breach of the legal requirements of the UNECE Aarhus Convention led to a legal investigation there by the UNECE Compliance Committee. In July 2014, the Parties to the Convention adopted a ruling of non-compliance in International Law, 'Decision V/9g of the Meeting of the Parties on compliance by the European Union with its obligations under the Aarhus Convention'.[104] The UNECE recommendations on Decision V/9g requiring the EU to:

- *"…. adopt a proper regulatory framework and/or clear instructions for implementing article 7 of the Convention with respect to the adoption of NREAPs. This would entail that the Party concerned ensure that the arrangements for public participation in its member States are transparent and fair and that within those arrangements the necessary information is provided to the public. In addition, such a regulatory framework and/or clear instructions must ensure that the requirements of article 6, paragraphs 3, 4 and 8, of the Convention are met, including reasonable time frames, allowing sufficient time for informing the public and for the public to prepare and participate effectively, allowing for early public participation when all options are open, and ensuring that due account is taken of the outcome of the public participation. Moreover, the Party concerned must adapt the manner in which it evaluates NREAPs accordingly".*

This non-compliance in International law is automatically non-compliance with EU law, as the Convention is an integral part of EU legal order. The Court of Justice of the European Union (CJEU) has already made it clear, because the Convention takes precedence in the EU legal structure, if there is a conflict with secondary legislation, such as a Directive, EU and Member State institutions and judiciary would have to apply the provision of the Convention and derogate from the secondary law provision.[105]

However, the EU has refused to comply with this ruling and EU citizens are unable to enforce it, as they have no right of access to the CJEU. This failure to provide the access to justice provisions of the Convention has led to additional findings of the UNECE Compliance Committee against the EU. However, to the huge annoyance of the other eighteen Parties (countries to the Convention), the EU and its Member States at the Treaty Convention in September 2017 used its blocking votes to prevent a further Decision in non-compliance from being taken against it in International Law with respect to these failings in access to justice.

As has been documented in more detail elsewhere, compliance proceedings at UNECE are continuing against the EU, the Compliance Committee issuing a further sharp rebuke to the EU in their February 2019 progress review.[106] This found that not only had the EU failed to make any meaningful progress towards compliance with the implementation of the NREAPs and the lack of access to justice provisions, but that

[104] https://www.unece.org/fileadmin/DAM/env/pp/mop5/Documents/Post_session_docs/Decision_excerpts_in_English/Decision_V_9g_on_compliance_by_the_European_Union.pdf

[105] See documentation of 21.11.2007:
https://www.unece.org/env/pp/compliance/Compliancecommittee/17TableEC.html

[106] https://www.unece.org/fileadmin/DAM/env/pp/compliance/Requests_from_the_MOP/ACCC-M-2017-3_European_Union/Correspondence_with_the_Party_concerned/First_progress_review_on_M3_EU_adopted_22.02.2019.pdf

its new Regulation on an Energy Union (adopted in late December 2018) had also failed to comply with the public participation requirements of the Convention. Namely in the manner in which the National Energy and Climate Plans (NECPs) were adopted, yet again bypassing legally required public participation procedures. The UNECE Compliance Committee's Second Progress Review of 26th February 2020 on ACCC/M/2017/3[107] provided the following '*Concluding remarks regarding evaluation of NECPs*':

- *67. In light of the above, the Committee considers that the Party concerned has not yet demonstrated that it has met the requirements of the final sentence of paragraph 3 of decision V/9g. The Committee invites the Party concerned to provide, together with its final progress report:*
    - *(a) For each member State, the relevant sections of its final 2021-2030 NECP which address the public participation carried out thereon;*
    - *(b) For each member State, the evaluation carried out by the Commission regarding the public participation carried out with respect to the final 2021-2030 NECP;*
    - *(c) An explanation of the specific measures it has by that date taken with respect to each member State whose information on the implementation of article 7 in its final 2021- 2030 NECP was either (i) insufficient or (ii) reveals a possible failure to carry out public participation that fully met the requirements of article 7 of the Convention.*

On the 14th October 2013, the European Commission adopted a list of 248 key energy infrastructure projects.[108] These projects were selected by twelve regional groups established by the new guidelines for trans-European energy infrastructure (TEN-E) and were to benefit from faster and more efficient permit granting procedures and improved regulatory treatment. They were also to have access to considerable sources of multibillion EU funding. As can be seen from Figure 1.13 overleaf, Ireland in particular was to be criss-crossed with high voltage interconnectors, whose sole purpose was to facilitate the installation of even more wind farms. The Irish grid is already overloaded with wind energy with considerable curtailment (dumping) of both conventional and renewable generation. However, the plan is to now transmit even more wind energy at enormous cost to other EU countries.

There was a failure to comply with the public participation procedures of the Convention in relation to the manner in which this list of Projects of Common Interest (PCI) was adopted. This was not an academic issue, as under this TEN-E Regulation,[109] its Article 7 on 'Priority status' of projects of common interest defined:

- *1. The adoption of the Union list shall establish, for the purposes of any decisions issued in the permit granting process, the necessity of these projects from an energy policy perspective, without prejudice to the exact location, routing or technology of the project.*

[107] https://www.unece.org/?id=48110

[108] http://ec.europa.eu/energy/infrastructure/pci/pci_en.htm

[109] https://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex%3A32013R0347

In other words once a project went on the list, it was a 'done deal'. If the public at the Member State subsequently heard about it for the first time when the project approval process (planning) started, any queries they raised as to the justification for the project, such as in relation to costs and benefits, would be just thrown in the bin, as irrelevant to the decision-making.

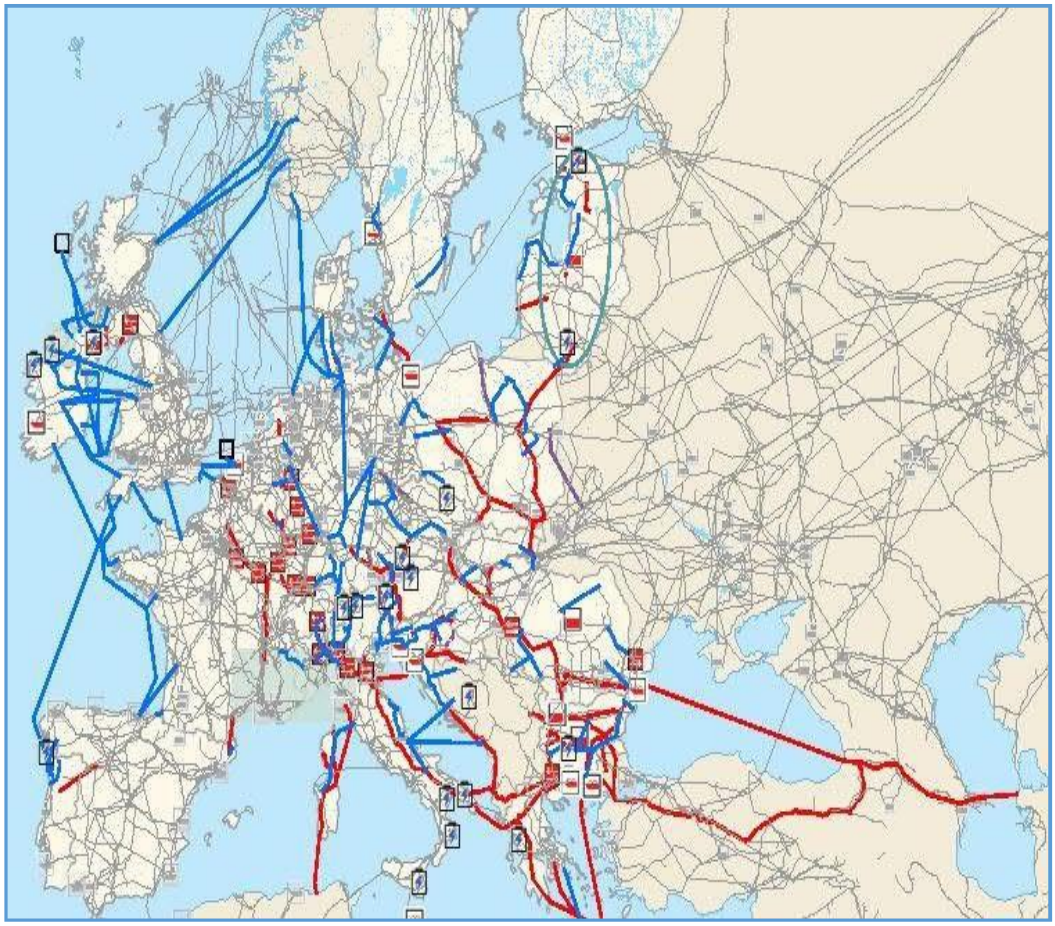

Figure 1.13: *EU's Projects of Common Interest (PCI) from Communication ACCC/C/2013/96 – the blue being High Voltage Electrical Infrastructure and red being gas networks*

The EU conducted the 'consultation' for the adoption of this PCI list on an obscure part of their website. No environmental information on the projects was available, such as costs, benefits, impacts, etc., while the language of the consultation was restricted to English, the native language of only some 13% of the then EU-28. A Communication and legal investigation at UNECE followed, the draft findings of the Compliance Committee published in April 2020 were:[110]

- *(a) By not informing the applicant that longer timeframes would be needed to reply to the information requests and of the reasons therefor, the Party concerned failed to comply with article 4(2) of the Convention;*

[110] https://www.unece.org/environmental-policy/conventions/public-participation/aarhus-convention/tfwg/envppcc/envppcccom/acccc201396-european-union.html

- *(b) By failing to ensure at least one review procedure that was expeditious, the Party concerned failed to comply with the requirement in article 9(1), second sentence, of the Convention to ensure an "expeditious" procedure for the reconsideration of information requests;*

- *(c) By failing to demonstrate, in a transparent and traceable way, how due account was taken of the public participation with respect to the first PCI list, the Party concerned failed to comply with article 7 in conjunction with article 6(8) of the Convention;*

- *(d) By not making the main consultation documents available to the public in its official languages other than English, the Party concerned discriminated against non-English speaking members of the public in the European Union and thus failed to comply with article 3(9) of the Convention.*

The subsequent draft Recommendations were:

- *The Committee, pursuant to paragraph 36 (b) of the annex to decision I/7 of the Meeting of the Parties, [and noting the agreement of the Party concerned that the Committee take the measures requested in paragraph 37 (b) of the annex to decision I/7,] recommends that the Party concerned take the necessary legislative, regulatory or other measures and practical arrangements to ensure that in public participation procedures within the scope of article 7 of the Convention carried out under the TEN-E Regulation, or any superseding legislation:*

    - *(a) The main consultation documents are provided to the public in all the official languages of the Party concerned;*

    - *(b) Due account of the outcomes of the public participation is taken, in a transparent and traceable way, in the decision-making.*

The Compliance Committee will therefore on an on-going basis monitor subsequent public participation exercises on this Regulation or superseding legislation. However, Article 7 of the Convention applies to "public participation concerning plans, programmes and policies relating to the environment", which is very broad in scope. The points (a) and (b) therefore are a legal interpretation with respect to the EU in how all such public participation exercises under Article 7 have to be conducted.

The EU continues to be a serial offender, in ignoring its legal obligations under the Aarhus Convention. Such as in October 2019 providing a €530 million grant from the European Investment Bank for the Celtic Interconnector to link Ireland and France, which was one of these Irish PCIs.[111] A project, which without this investment of public money, would be impossible to fund, as it is hopelessly uneconomic. Such capital grants being once again State Aid to the wind energy sector, aid which has never complied with legal due process.

[111] https://www.dccae.gov.ie/en-ie/news-and-media/press-releases/Pages/Press-Release-Government-Secures-%E2%82%AC530m-EU-grant-for-Celtic-Interconnector.aspx

Further details on these UNECE compliance proceedings is summarised elsewhere,[112] but suffice is to say these decisions on both the renewable programme to date and the future renewable programme post 2020 are being taken behind closed doors by a limited number of select officials and 'favoured representatives'.

This is occurring in a manner which is non-transparent, bypassing the public's rights for participation and which is downright illegal. For example, the original findings of the UNECE Compliance Committee in relation to the 2010 adoption of the Irish NREAP documented how an initial targeted consultation was carried out with selected entities, but not with the wider public.[113]

As the Irish NREAP documents in its Appendix 6, this was with members of the so called 'Renewable Energy Development Group'.[114] Not surprisingly, this is a list of 33 entities comprising Government departments, agencies, semi-states and companies investing in the renewable sector. It could accurately be described an insider cabal of preachers and bootleggers. The public or even the interests of the public were nowhere to be seen.

1.17 Conclusions

The climate change and renewable policies currently being pursued are environmentally, technically, financially and legally completely flawed. They are being relentless driven by political goal setting, which has never even remotely demonstrated that it could first identify and quantify the problem, which as it stands doesn't exist. It has now developed a momentum that has lost all connection with meteorological circumstances and instead is justified by individuals' moral and political superiority.

As a society we have been there before, just over a hundred years ago, a wave of nationalistic fervour gripped Europe. Young men rushed off to the front for King or Kaiser on the basis that it would all be over by Christmas. Gangs of women roamed the streets handing out white feathers to men, who were not in uniform. Sadly, the destruction and slaughter that followed was on an unprecedented scale. The twenties were characterised by mass hysteria on the stock market, which led to the terrible crash of 1929 and the subsequent great depression.

The Bolshevik ideology also rose to power in the twenties and wreaked havoc for several subsequent decades. In the thirties, the ideology of the National Socialists rose to the fore and it also subsequently wreaked total havoc. The Germans not content with two episodes of mass hysteria in the earlier parts of the 20th Century lost the run of themselves over Waldsterben (dying forests) in the eighties,[115] while

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[112] See for example: https://www.thegwpf.com/un-legal-tribunal-issues-rebuke-of-eu-renewable-energy-programme/ and https://mailchi.mp/30f2915d1ae2/un-censures-eu-on-illegalities-around-renewable-energy-programmes See also page 68 and Section 5: https://www.documents.clientearth.org/wp-content/uploads/library/2019-02-26-access-to-justice-in-european-union-law-a-legal-guide-on-access-to-justice-in-environmental-matters-ce-en.pdf

[113] https://www.unece.org/fileadmin/DAM/env/pp/compliance/C2010-54/Findings/ece_mp.pp_c.1_2012_12_eng.pdf

[114] https://www.dccae.gov.ie/documents/The%20National%20Renewable%20Energy%20Action%20Plan%20(PDF).pdf

[115] https://notrickszone.com/2011/05/26/documentary-on-the-german-waldsterben-hysteria-looking-back-30-years/

currently they are immersed in hysteria over shutting down perfectly viable nuclear plants[116] and plastering their countryside at enormous cost with wind turbines and solar panels (Energiewende).

Globally since 1999, we have had the mass hysteria related to Y2K, the 'dotcom' bubble and crash, and further hysteria related to the war on terror and the Weapons of Mass Destruction (WMD) which weren't there. One could also throw in swine flu for good measure and not forget the madness of the build-up to the crash of 2008.

Now the weather is allegedly all out of control, when there is no evidence that it actually is. However, history teaches us all that is required is a scary hypothesis, a promise of some form of better Nirvana, or even better a combination of the two, plus then let the groupthink and exuberance take over. As Mark Twain put it; "*it's a lot easier to fool people then to convince them that they have been fooled*". Pity that time and time again an awful mess has to be first left behind before the realisation dawns and the pendulum swings. Sadly, the whole situation wouldn't arise in the first place without the chronically irresponsible behaviour of those placed in a position of trust and authority.

Pendulums do eventually swing, the German city of Cologne executed 37 women and men and one boy as witches during medieval times. Currently measures are occurring to rehabilitate these, the City council in 2012 adopting a resolution acquitting a woman of being a witch in 1627.[117] Similar occurrences are occurring around municipalities in Germany based on the documents available for specific witch trials.[118]

Enormous sums of money have simply disappeared in 'thin air' to fund this EU renewable energy programme. This programme has also damaged the environment of Europe, adversely affecting its landscape, biodiversity and the health of those who live in rural areas too close to these turbines. Malfeasance is intentional conduct that is wrongful or unlawful, especially by officials or public employees. We are where we are with this renewable programme solely because of malfeasance. A malfeasance well documented at the highest levels, the documentation being publically available on the UNECE website and various legal journals.[119] There are already a considerable number of legal cases against wind energy developments, which have slowed its development in recent years.[120] More will result as an increasing number of citizens object to the damage to their local environment the huge costs imposed upon them, all to satisfy a failed ideology.

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[116] Plus doing so in a manner which was not fully legal and has as a result meant compensation claims have to be paid:
https://phys.org/news/2018-05-berlin-compensate-power-firms-nuclear.html

[117] https://www.irishtimes.com/news/cologne-council-adopts-resolution-acquitting-woman-of-being-a-witch-in-1627-1.463001

[118] https://www.dw.com/en/germany-cleric-battles-to-exonerate-innocent-witches/a-49137841

[119] For example: Barrett, E. 'In sowing the wind, how Ireland could reap the whirlwind' – a case against Irish wind development(s) Journal of Energy & Natural Resources Law, 2015 Vol 33, No 1, 59–81
https://docs.wind-watch.org/Barrett-Ireland-Aarhus.pdf

[120] https://www.dw.com/en/has-the-wind-been-taken-from-the-sails-of-europes-renewable-future/a-50886866

2. MINOR WARMING OR RUN AWAY CATASTROPHE?

2.1 Background

Humans successfully live in regions as diverse as the tropics to the polar North. It is not unusual for many successfully inhabited regions to have an annual temperature range of -20 ºC to +40 ºC, while over the course of a single day a temperature range of nearly half of this is not uncommon. To some environmental campaigners, any influence of man on the planet is unacceptable, but then we are getting into a level of extremism in which the depopulation of the planet is the objective.

William Nordhaus is an American economist and Professor of Economics at Yale University, who is best known for his work in economic modelling and climate change and was one of the two winners of the 2018 Nobel Prize in Economic Sciences. Figure 2.1 below is an extract from one of his papers.

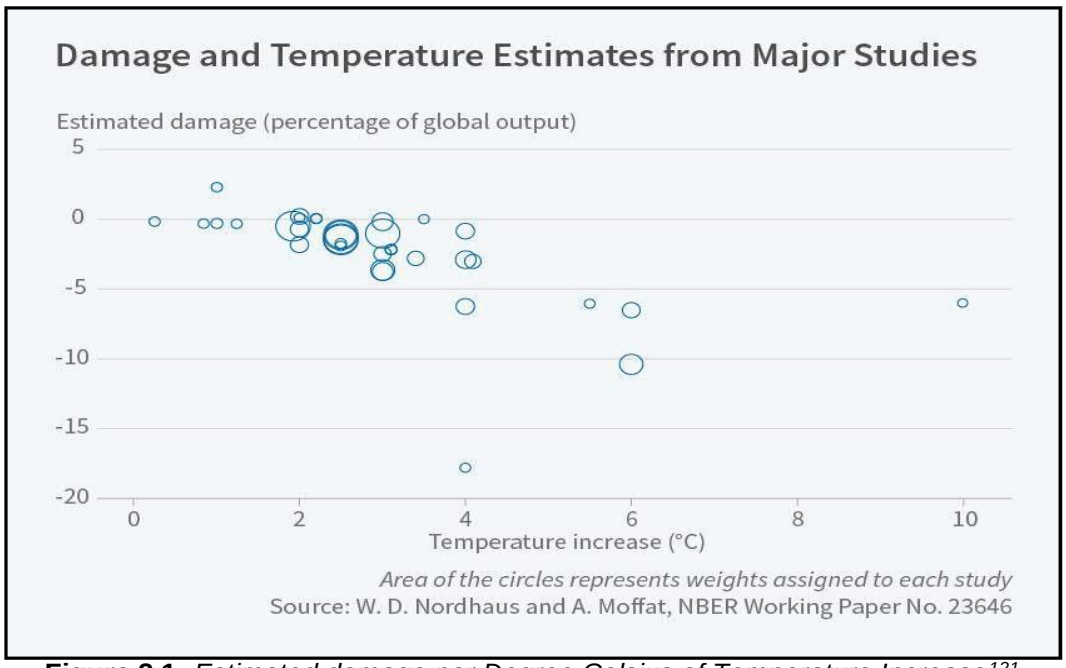

Figure 2.1: *Estimated damage per Degree Celsius of Temperature Increase*[121]

What the above shows is that a mild warming of the order of 2 ºC is not detrimental. Indeed, it may even be beneficial, as it is the cold which has the potential to cause more hardship. In practice an increase in temperature of 1 ºC is equivalent to a move of some 200 km nearer to the equator, Belfast gets Cork's climate.[122] It is not until significant warming occurs, such as 4 ºC or more, that significant damage can be considered to be occurring. In a nutshell, not all global warming is catastrophic or even harmful, it is the extent of the warming which counts.

[121] https://www.nber.org/reporter/2017number3/nordhaus.html

[122] Belfast mean temperature 8.9 ºC while that of Cork is 9.9 ºC:
https://en.climate-data.org/europe/united-kingdom/northern-ireland/belfast-6014/
https://www.met.ie/climate-ireland/1981-2010/cork.html

As this Section goes on to explain, for catastrophic warming to occur requires far more than just CO_2 emissions, it also requires the planet's climatic systems to be in a state of complete instability, an instability for which the evidence is simply not there. The future is always unknown, but so too is the fact that as a society we always live with a degree of unknowns. For example, in deciding that a defendant is guilty, the jury have to accept a degree of unknowns, in that they weren't actually there. They are also presented with diametrically conflicting hypotheses during the trial, but in coming to their decision, they will usually apply what is known as Occam's razor:

- *Occam's razor (also Ockham's razor; Latin: lex parsimoniae "law of parsimony") is a problem-solving principle that, when presented with competing hypothetical answers to a problem, one should select the one that makes the fewest assumptions. The idea is attributed to William of Ockham (c. 1287–1347), who was an English Franciscan friar, scholastic philosopher, and theologian.*

In other words, straightforward concepts, which do not require a high degree of complexity and interactions to explain the evidence which is available, are inherently better.

2.2 Historical knowledge of our climate

Any study of climatic systems should start with a review of our knowledge of the past. Armagh Observatory in N. Ireland has one of the longest temperature records on the planet, see Figure 2.2 below. In addition, Armagh has not grown dramatically over the intervening two centuries, so the record is not appreciably affected by the impact of urbanisation, which by its nature tends to create a heat island.

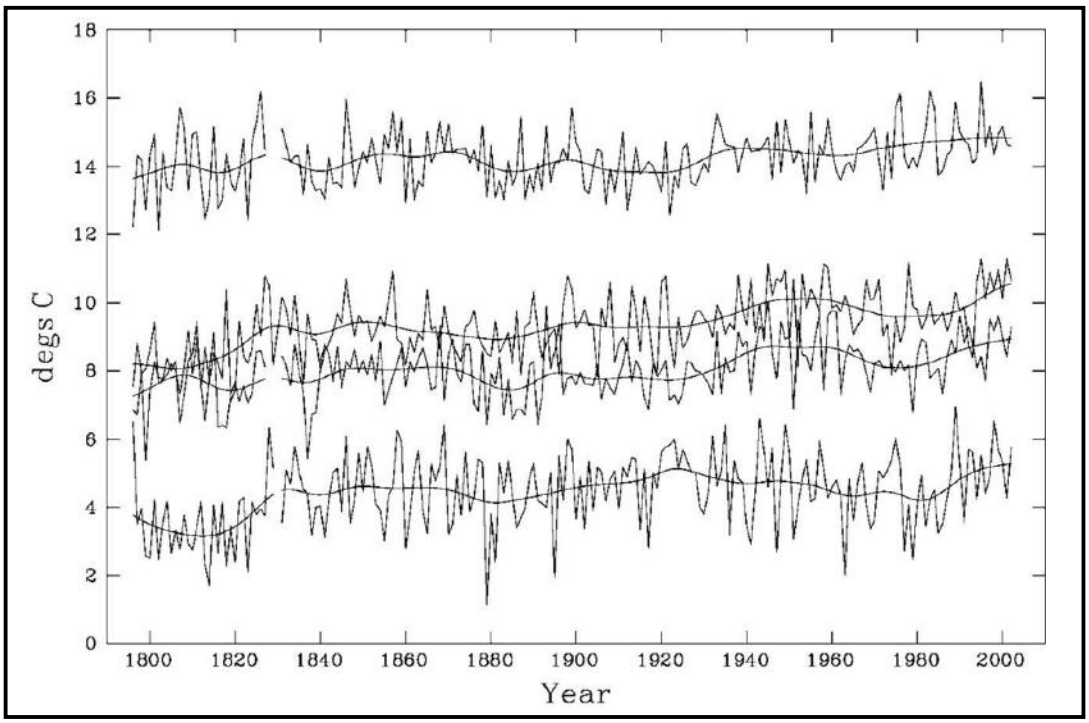

Figure 2.2: *Armagh Observatory temperature record; from the bottom, winter, spring, autumn, summer*[123]

[123] http://artefacts.ceda.ac.uk/badc_datadocs/armagh/445.pdf

What is obvious is that there has been little change in summer temperatures, with the biggest change occurring to winter temperatures in the period 1800 to 1830. Furthermore, there is also an indication of an undulating cycle, of about 30 years of warmer conditions followed by 30 years of somewhat colder (see the 1920s and 1930s versus the 1960s and 1970s). This is a point which will be returned to later in Section 2.8. However, if there is any degree of significant change in the record, then this is clearly that of the period 1800 – 1830. In 1820 the world's population was 1.05 billion, the industrial revolution was in its infancy and the steam train had not been invented. In other words, it wasn't CO_2 which was driving the change.

A global mean surface temperature record is by its nature a problematic concept, as the planet is quite diverse by its nature and subject to significant temperature variations (see Section 2.10), while urban heat impacts have affected many temperature recording sites, which are now located in busy urban areas or airports. However, Figure 2.3 below does provide such a historical global mean surface temperature record. That the temperature has risen since the 1850s is not disputed, but a point of relevance, which will be returned to later, is that the temperature rise in the period 1920 to 1940 is not much different to the rise in the period 1980 to 2000.

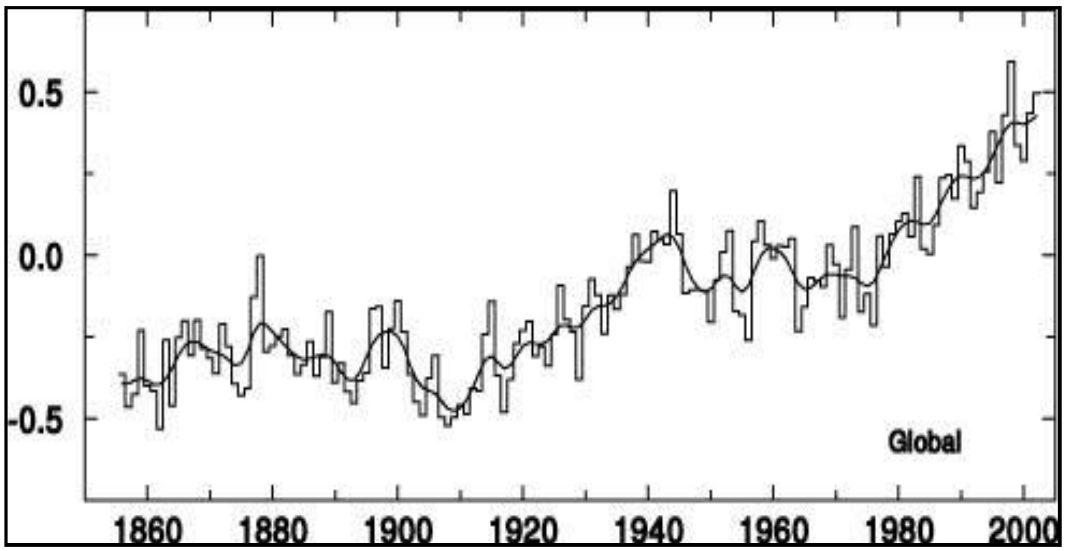

Figure 2.3: *Historical global mean surface temperature record HADCRUT1*[124]

H.H Lamb was a post war meteorologist and founding father of climatic research. While his work predating the founding of the IPCC and the increasing dominance of computer modelling, his book "Climate History and the Modern World" is like a detective novel piecing together from old records mankind's passage through time and how the climate changed. Explaining such as why in Ireland we have the Ceide Fields and bog oak.[125] As can be seen from Figure 2.4 overleaf, the Medieval period was warm, which was then followed by the 'Little Ice Age', before a general rise in temperature to present day circumstances. However, we have not yet reached the same temperatures as expereinced in what is referred to as the 'Medieval Warm Period'.

[124] https://crudata.uea.ac.uk/cru/data/crutem1

[125] https://ens9004-mza.infd.edu.ar/sitio/upload/08-%20LAMB,%20H.H.%20-%20LIBRO%20-%20Climate,%20History%20and%20the.pdf

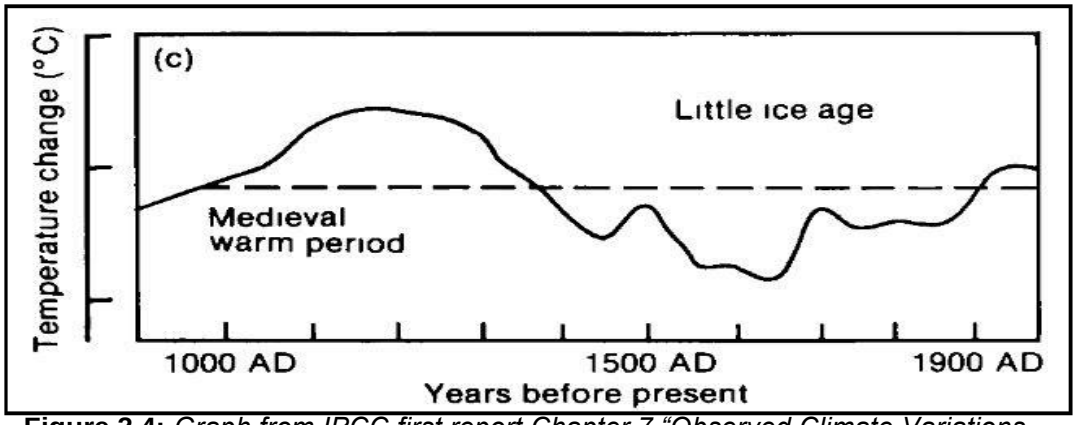

Figure 2.4: *Graph from IPCC first report Chapter 7 "Observed Climate Variations and Change", which was based on H.H Lamb's work*[126]

Indeed, Tim Severin in his recreation of the 'Brendan Voyage' in the 1970s consistently refers in his book as to how climatic conditions would have been more favourable in the Medieval times of St Brendan, when Irish monks crossed the Atlantic in a leather boat. Figure 2.5 below shows the climatic record of the Greenland ice cores, which puts the above climatic trend into a longer context.

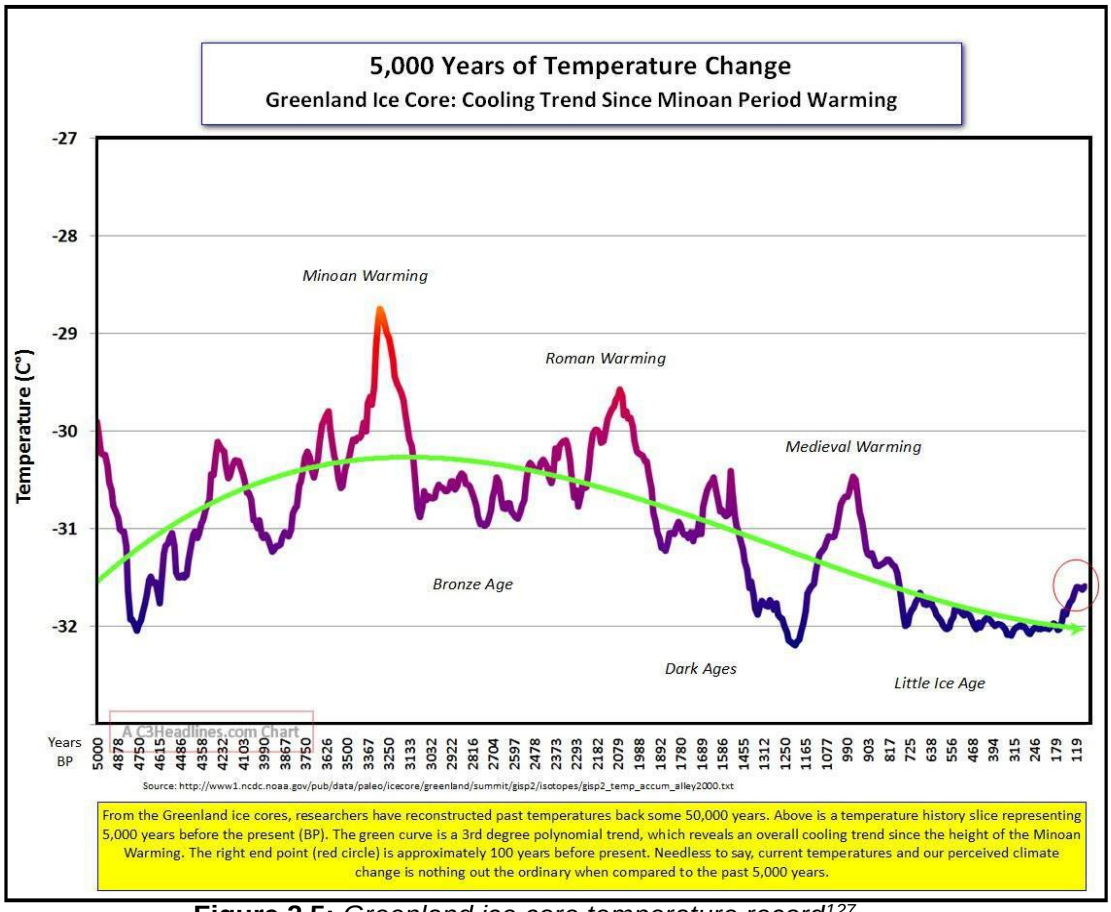

Figure 2.5: *Greenland ice core temperature record*[127]

[126] https://www.ipcc.ch/ipccreports/far/wg_I/ipcc_far_wg_I_chapter_07.pdf

[127] https://www.c3headlines.com/temperature-charts-historical-proxies.html

While H.H Lamb's research would have pre-dated access to the above ice core data, his book eloquently describes the major consequences which occurred when the climate shifted from the Medieval Warm Period to the Little Ice Age. Similarly the 'Dark Ages', which followed the Roman Period were a time of great upheaval and difficulties. In general the extended record shows a decreasing trend and in the main, it is quite stable and self correcting.

However, history does have to get rewritten to suit the politics, and this is what happened with the famous 'Hockey Stick' graph, see Figure 2.6 below, which featured strongly in the 2001 Third Assessment Report of the IPCC, in particular its Summary for Policy Makers.[128]

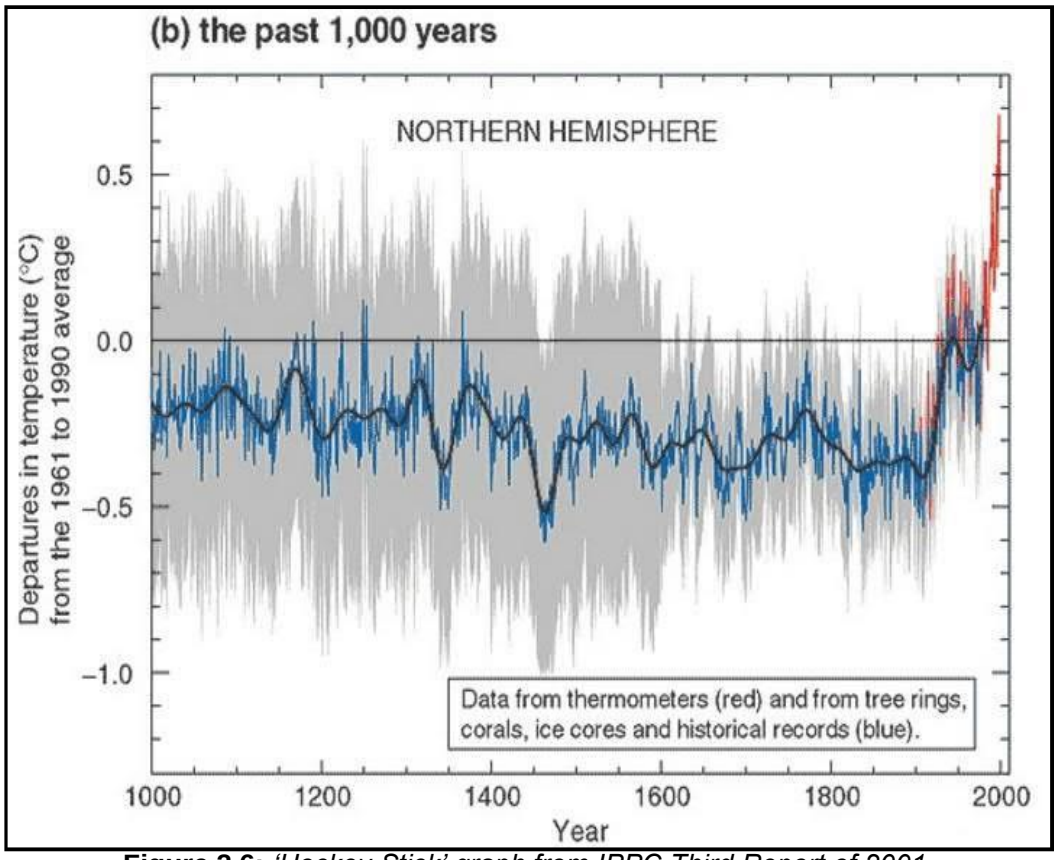

Figure 2.6: *'Hockey Stick' graph from IPPC Third Report of 2001*

This lead to huge controversy, as it sought to effectively 'wipe out' the Medieval Warming Period and what was known and accepted by the research community to that point. There was also a refusal to provide access to the data, which was used to generate this graph, which lead in time to the release of the 'climategate' e-mails. This story is written elsewhere,[129] but effectively the above graph was generated by the use of unsuitable data and biased statistics. Many would rightly consider it as politically motivated fraud and there is considerable evidence to support this position.

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[128] https://gridarendal-website-live.s3.amazonaws.com/production/documents/:s_document/287/original/wg1spm.pdf?1488203631

[129] Such as in the "The Hockey Stick Illusion: Climategate and the Corruption of Science" by A.W. Montford

It also highlights a fundamental principle, in that source data for scientific claims has to be made available, such that it can be replicated by others. Particularly so when such claims are being made to deliberately influence policy makers in areas, which involve enormous public spending and constraints on people's lifestyles. As it turns out this highly publicised graph is no longer used by the IPCC. However, this then 'begs the question', if a number of sceptically minded citizens had not been motivated to chase after the supporting information and the e-mails and other documentation had not come to life documenting the degree of deception occurring, then where would we be now?

2.3 Fossil fuels and the global carbon cycle

Figure 2.7 below shows the historical growth in carbon emissions from fossil fuel usage, which when expressed alternatively in emissions of CO_2, currently equates to about 36 billion tonnes per annum.[130] What is clear, and is generally accepted by the scientific community, is that emissions did not grow significantly until around 1950. That fossil fuel emissions of CO_2 are potentially a driver of climatic change, is really a concept applying to the post 1950 era. Furthermore, the global population in 1950 was 2.53 billion, while it is now 7.3 billion, although this growth is levelling off.[131]

If we refer back to Figure 2.3, as was pointed out, the rise in global temperature, which occurred in in the period 1920 to 1940 is not much different to the rise in the period 1980 to 2000, yet the alleged driver for this, namely CO_2 emissions, was radically different in the two periods. Note: Irish emissions, as was explained previously in Section 1.7, amount to about 60 million tonnes of CO_2 per annum.

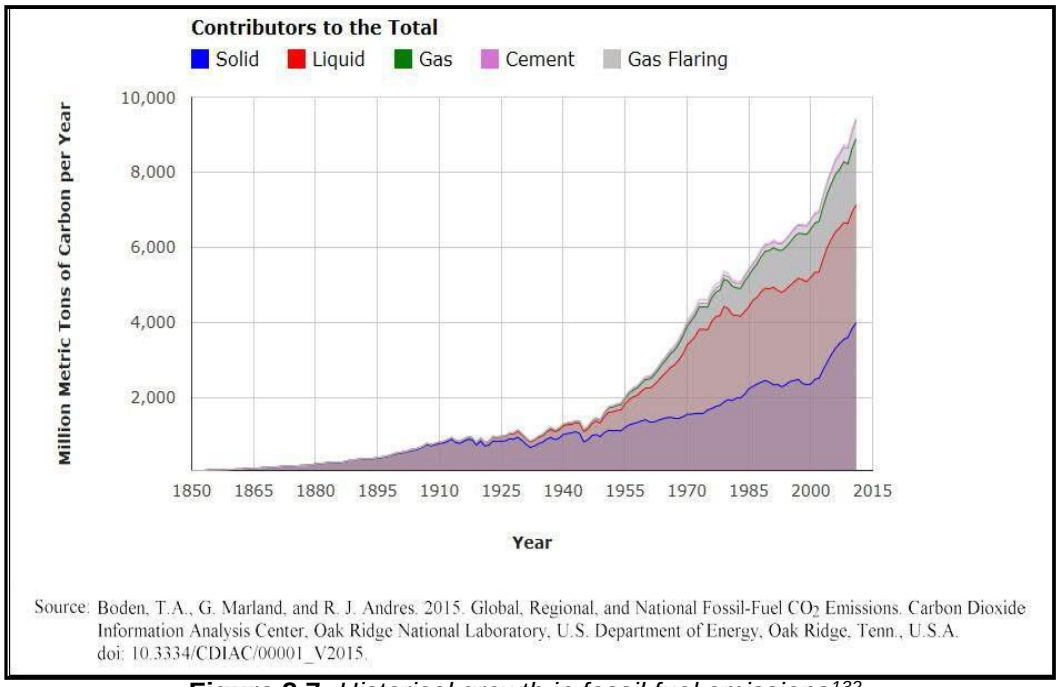


Figure 2.7: *Historical growth in fossil fuel emissions*[132]

[130] To convert emission in Carbon to CO_2; molecular weight of CO_2 is 44 kg/kmol and carbon 12 kg/kmol. Therefore a conversion factor of 3.67

[131] Global population in 1950 was 2.53 billion, now 7.3 billion

[132] https://cdiac.ess-dive.lbl.gov/trends/emis/glo_2010.html

It is generally accepted that the pre-industrial concentration of CO_2 in the atmosphere was about 280 parts per million (ppm) or 0.028%. As the emissions above rise, there is also an increase in measured concentrations of CO_2 in the atmosphere, but this is a complex relationship, as will be explained later, while as Figure 2.8 below shows, no statistically relevant correlation exists between increasing CO_2 in the atmosphere and global surface temperatures.

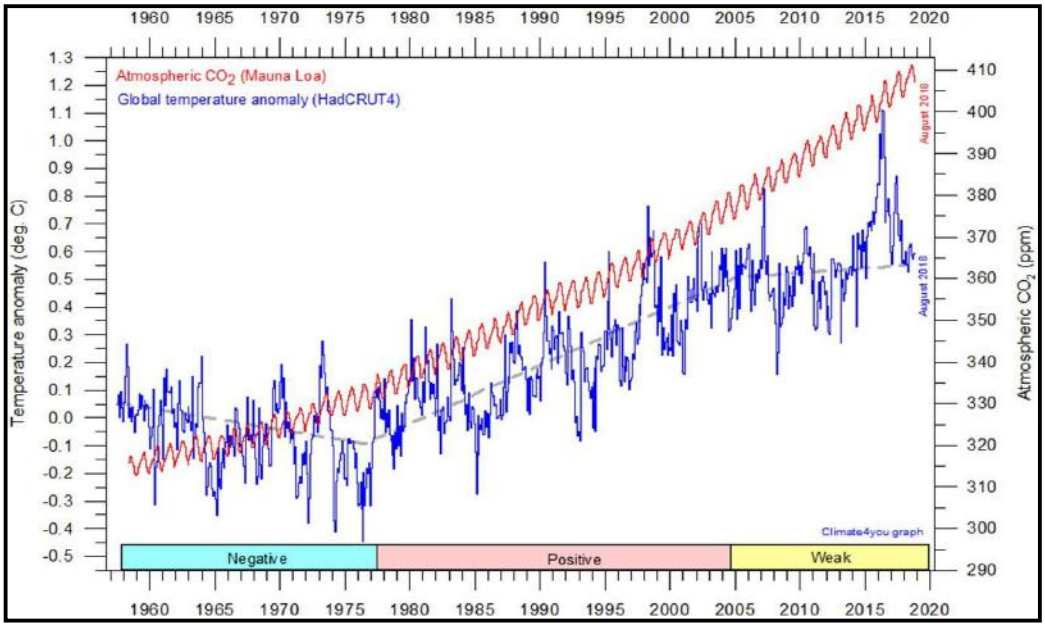


Figure 2.8: *Relationship between global temperature change and rising atmospheric CO_2 concentrations*[133]

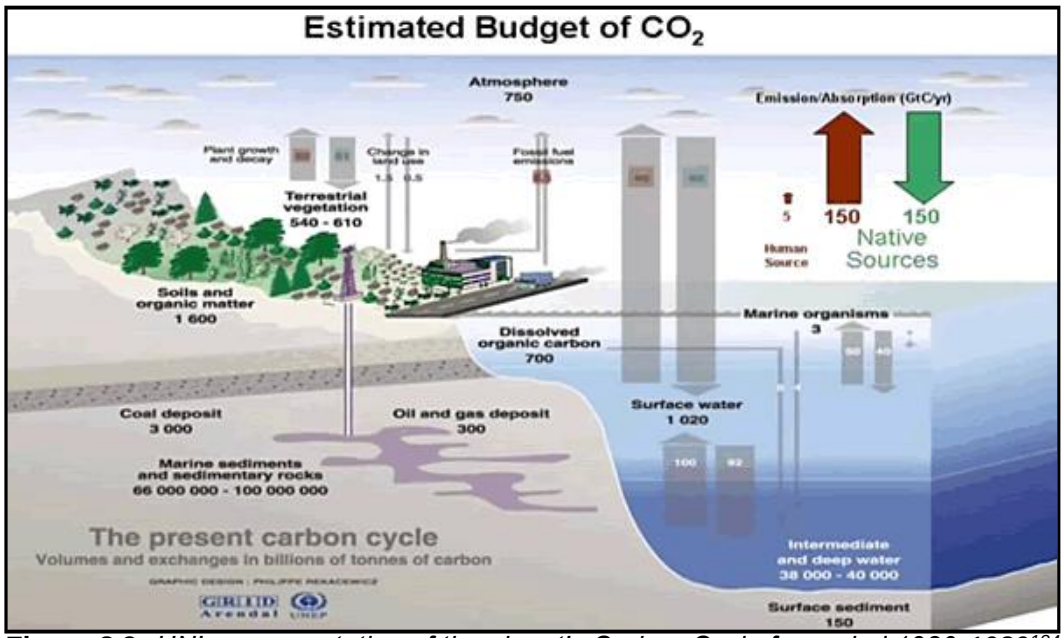


Figure 2.9: *UN's representation of the planet's Carbon Cycle for period 1980-1989*[134]

[133] https://www.climate4you.com/ Greenhouses Gases

Figure 2.9 above is a representation of the global carbon cycle, showing not only the complexity of the mass flows, but that the natural cycles completely dominate the anthropogenic (manmade) contribution. The tiny red arrow on left (5 Gt/Cyr now closer to 9 Gt/Cyr see Figure 2.7) is the anthropogenic fraction, while the big red and green arrows (150 Gt/Cyr) are the natural carbon exchange, which is primarily driven by the oceans both degassing and reabsorbing CO_2.

Even a minor imbalance between natural sources and sinks can overwhelm the anthropogenic component of CO_2 emission. Neither are we remotely in a position to verify the flows depicted above. As a result, there is still some considerable scientific controversy, as to what percentage of the current increase in atmospheric CO_2 concentrations is due to natural degassing of the oceans, which is occurring as we experience a warming cycle following the 'Little Ice Age', versus the contribution from burning of fossil fuels.

2.4 So what is the greenhouse effect?

Chemical engineers attach great importance to the completion of heat and mass balances around the industrial facilities they are designing. These are the detailed assessments of the how heat and mass flows through the process and are the cornerstone of such designs. Figure 2.10 below, on paper at least, appears to be a very fine heat balance of the planet.

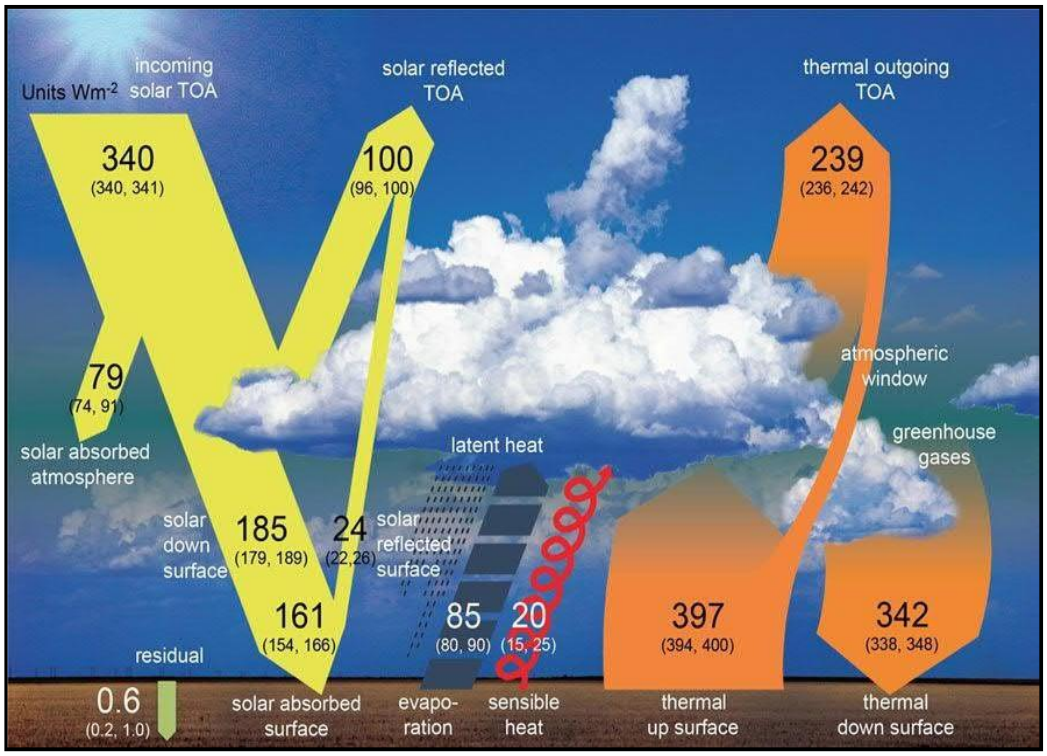


Figure 2.10: *IPCC representation of Global Energy Balance*[135]

[134] https://www.grida.no/resources/6453

[135] Figure 2.11 of the IPC AR5 Report:
https://www.ipcc.ch/report/ar5/wg1/observations-atmosphere-and-surface/

However, the section of the IPCC report from which it is derived "2.3.1 Global Mean Radiation Budget" is full of caveats as to how the figures are uncertain. In reality, Figure 2.10 is nothing more than a 'pretty picture'. Take for instance what should be easy, the measurement of the incoming solar radiation, the sun after all being the biggest driver of our climate. Do we know this figure to be right?

The atmosphere prevents us from obtaining a direct measurement of incoming solar radiation at ground level, as is shown above, so it was only with the recent advent of satellites that we have been able to get above the atmosphere to measure it. However, the readings from the satellites that have been utilised have differed and the measurement devices have decayed over time. We also know that the sun's output varies; there is the 'eleven year' sun spot cycle, while there are variations over a longer period. So while a numerical figure above is presented, this may be a snapshot of a short period of time, but is not necessarily an accurate representation of what happens over a longer period.

What is known as the 'greenhouse effect' can also be seen in Figure 2.10, the heat from the incoming solar radiation is partly reflected as longer wave infra-red radiation from the relatively warm surface of the planet. As this long wave infra-red radiation (depicted in orange) passes through the atmosphere, some of it is caught by the molecules there and re-radiated back to the earth's surface, while a fraction continues straight out to space. This re-radiation is the 'greenhouse effect'. However, the numbers assigned to the heat flows above are nothing but pure guesswork. For example as NASA point out:[136]

- *We find that water vapor is the dominant substance — responsible for about 50% of the absorption, with clouds responsible for about 25% — and CO_2 responsible for 20% of the effect (exact numbers disputed and not known) The remainder is made up with the other minor greenhouse gases, ozone and methane for instance, and a small amount from particles in the air (dust and other "aerosols").*

The bottom line is that water vapour is the overwhelming dominant driver of this 'greenhouse effect' and as we all know, it's presence in the atmosphere is highly variable and certainly not something that can be measured on a global scale. Indeed, while the CO_2 concentration is 400 ppm, the average water vapour concentration is estimated to be somewhat in the region of 25,000 ppm, but this is a guess as the ratio of the number of water molecules to CO_2 molecules varies from 1:1 near the poles to circa 97:1 in the tropics.

The reason for this being that cold air cannot hold the level of moisture that warm air does, which is due to the principle of saturation. For example, as warm air cools as it ascends, clouds form and precipitation occurs; the colder air now carrying an excess of water vapour beyond its saturation point at that temperature. There is therefore a complex meteorological relationship between the temperature of the air and its moisture content, e.g. a one percent increase in relative humidity or in low cloud cover decreases the temperature by 0.15 °C and 0.11 °C, respectively.[137] Water vapour is the dominant atmospheric gas contributing to the 'greenhouse effect', but we are simply not in a position to quantify the actual role it plays.

[136] https://www.giss.nasa.gov/research/briefs/schmidt_05/

[137] https://journals.sagepub.com/doi/abs/10.1260/0958-305X.25.2.389?journalCode=eaea

However, this is only part of the complexity, as Figure 2.10 on the left shows, as the solar radiation is incoming, it is partly reflected back to space. This reflection is called 'albedo'; clouds naturally have an albedo, but this is also a variable factor and dependent on parameters such as size, location (upper atmosphere versus lower atmosphere), colour, etc. The earth also has an albedo, dark surfaces will absorb incoming radiation, but if they are covered in ice and snow the albedo will be much higher as the radiation is reflected. Figure 2.11 below shows therefore in a simple schematic fashion the complexity of the dynamics occurring with various cloud cover.

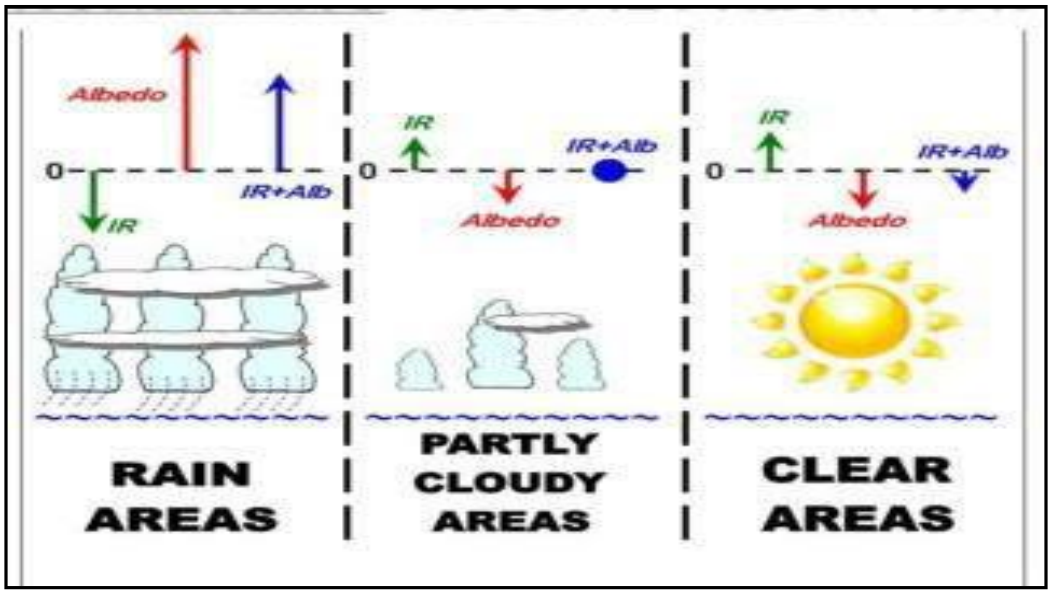


Figure 2.11: *Conceptual model of typical variations of IR, albedo and (IR + albedo) associated with three different areas of rain and cloud for periods of increased precipitation*[138]

In the 'rain areas' the significant cloud cover is directly related to the fact that the air is saturated with a high concentration of water vapour. As a result, this water vapour is responsible for a strong 'greenhouse effect' depicted by the green arrow showing the net infrared flow being reflected back to the earth. However, as the clouds are well developed, the albedo is strong with considerable reflection of the incoming solar radiation, which is denoted by the red arrow going to space. The combination of the two is the blue arrow, which in these circumstances shows a net reflection of radiation to space and a cooling effect.

In the partly cloudy areas, the concentration of water vapour is lower and in many cases below saturation. This results in a reduced greenhouse gas effect, such that the infrared radiation from the warm planet below is primarily lost to space. However, the albedo is now not so strong, such that there is net solar radiation flow to the planet below. In combination, the two cancel each other out, as shown by the blue dot, as the outgoing infrared radiation (green arrow) and incoming solar radiation (red arrow) are more or less equal.

In the final scenario, the sky is clear, as the air is relatively dry and below saturation. There is as a result a limited amount of water vapour such that the greenhouse effect

[138] https://tropical.colostate.edu/media/sites/111/2018/01/Bill-Gray-Climate-Change.pdf

is weak and a strong infrared flow to outer space occurs depicted by the green arrow. The albedo is weak as there are no clouds, so there is also a strong solar radiation inward flow, as depicted by the red arrow. The net result depicted by the blue arrow is that there is an overall inward flow of radiation to the earth and a heating effect.

In practice we know this ourselves, when the weather is dry and the sky clear, the days are warmer and nights colder than those days when the sky is covered with cloud. We also know how thunderstorms can have a welcome cooling effect after 'stifling heat'.

The planet is also temperature self-regulating by these means. Sea water temperature in the tropics rarely exceeds 32 ºC despite the sun remorselessly beating down on it. As the day progresses the rate of evaporation increases, resulting in a cooling effect for the sea water and the increasing build-up of clouds. By late afternoon huge thunderstorms often develop, which ascend into the upper atmosphere, where the global circulation patterns carry the energy North and South, see Figure 2.16 in Section 2.7. The rain falling from these thunderstorms has a local cooling effect, while the moisture carried aloft North and South on global circulation patterns has the ability to raise the temperature in those regions, which are not exposed to such intense direct sunlight, and hence incoming solar radiation, as the tropics.

This response is what is known as negative feedback, if the morning in the tropics is somewhat warmer, the evaporation and cloud development simply occurs that bit earlier, with the net result that there is simply a slight increase in local precipitation and the amount of moisture carried into the upper atmosphere. The planet most certainly does not spin out of control, getting hot and hotter.

Referring back to Figure 2.10, this does not reflect an accurate representation of the planet's heat balance, but rather the current 'guesswork' of the IPCC. Furthermore, the dynamics of clouds and their heat flows are highly unknown, and until they are known, which could take a long time, all we have is 'guesswork'. So if the IPCC cannot accurately represent the current heat balance of the planet, how then are they in a position, to make such definite statements, related to changes which are occurring? Particularly so, as is now explained in the next section, these changes to the heat balance are extremely limited in the order of their magnitude.

2.5 The limited impact of CO_2 on the planet's heat balance

The content of Figure 2.12 overleaf is crucial to any debate on Catastrophic Anthropogenic Global warming, but regretfully is neither known by nor explained to the public.

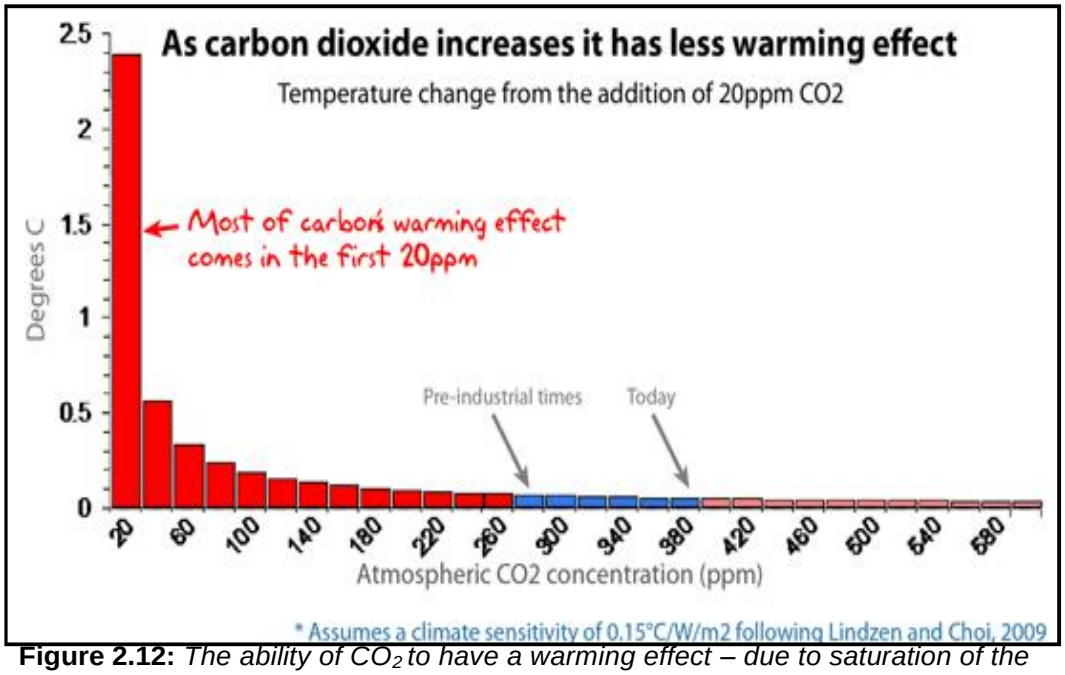


Figure 2.12: *The ability of CO_2 to have a warming effect – due to saturation of the wavelengths responsible for the 'greenhouse effect'*[139]

The wavelengths over which CO_2 absorbs and re-radiates infrared radiation are already almost completely saturated at low concentrations of CO_2, this radiative effect being logarithmic with respect to concentration. Such saturation is analogous to painting a wall, which was previously a dark colour, with a new white colour. With the first coat, the wall is predominately white, but a few dark streaks are discernible. With a subsequent coat or two, there is very little or any dark colour showing. From that point on adding additional coats, won't make any difference, as saturation with white paint has occurred. Another way of looking at it is suppose you had a wine cellar, but the buzz was only in the first glass and it didn't matter how much wine you drank after that.

At the pre-industrial CO_2 concentration of 280 ppm, the wavelengths over which CO_2 can be absorbed by carbon dioxide are already almost fully saturated, and as the relationship is logarithmic, most of that absorption occurred in the first 0 to 60 ppm. There is therefore limited additional greenhouse gas effect and hence warming occurring as the CO_2 concentration is increased further. Indeed, this greenhouse effect is rapidly tailing off. This is why with respect to the whole agenda of the impact of burning additional fossil fuels, the single most important number, and to which the whole conflicting argument can be distilled to, is the value of the climate sensitivity which is applicable?

This climate sensitivity is the estimated response of the planet to a doubling of the pre-industrial CO_2 concentration of 280 ppm to about 560 ppm. As Figure 2.12 above shows, there is very limited additional warming impact beyond this point. It would also take the combustion of more or less our known reserves of fossil fuel to raise the planet's CO_2 concentration to around 560 ppm, while at the same time a powerful feedback mechanism would be occurring. That the oceans absorb CO_2 is well known, see Figure 2.9, and the quantity of CO_2 in the oceans is some fifty times that in the atmosphere. As the concentration of CO_2 in the atmosphere increases, the rate of absorption into the oceans also increases, this is a well know law of physics called

[139] http://joannenova.com.au/2010/02/4-carbon-dioxide-is-already-absorbing-almost-all-it-can/

Henry's Law. CO_2 in the oceans is also sequestered into the carbonates in shellfish and similar calcifying organisms, which is how limestone is formed over time.

Many scientists doubt we would actually reach 560 ppm, but if it did, it most certainly wouldn't cause any direct harm us. As humans when we respire, we release CO_2, the level in exhaled air being about 3.8%, or 38,000ppm. The concentration limit in industry for an eight hour shift is 0.5% or 5,000 ppm, while higher values are often to be found in submarines, where sailors routinely perform complex tasks in a confined and pressurised environment with nuclear reactors and ballistic missiles.

Plants also need CO_2 to grow, so higher CO_2 levels improve growth rates, such that agricultural greenhouses are routinely raised in CO_2 concentration to 1,000 ppm. This improvement in growth is most pronounced in arid regions, as the plants there cannot open their stomata (pores) so wide to allow the necessary gas transfer, as they would then loose too much valuable water vapour. This then restricts their ability to take in the necessary CO_2 through their leaves for growth, a situation which is improved when the CO_2 concentration is higher. Numerous studies have shown that the planet is increasingly greener in the last few decades, with this increased biomass growth being predominately attributed to increased CO_2 concentrations.[140] This is welcome news, not least, as it correlates with increasing yields for grains and other foodstuffs. In a similar manner as how the aboriginal and Native American peoples routine use of fire was beneficial, so too is the CO_2 from usage of fossil fuels.

Referring back to the analogy of the wine cellar, the climate sensitivity can also be considered as equivalent to whom you feed that first glass of wine to. Is the planet in its response similar to a newly born baby with high sensitivities or is it more akin to a mature adult, who is used to having a drink or two? Surprisingly, there is little dispute or controversy in relation to the simple calculation from doubling the CO_2 concentration and the resulting temperature rise, which is in the order of about 1 ºC. This is a point always agreed by the IPCC; see below, where the GCMs are the Global Circulation Models.[141]

- *"In the idealised situation that the climate response to a doubling of atmospheric CO_2 consisted of a uniform temperature change only, with no feedbacks operating (but allowing for the enhanced radiative cooling resulting from the temperature increase), the global warming from GCMs would be around 1.2°C":*

As highlighted in the previous Section 2.1, this is equivalent to everybody moving about 200 km nearer to the equator, namely Belfast gets Cork's temperatures. So where does the environmental disaster come from what is Catastrophic Anthropogenic Climate Change?

2.6 How Catastrophic Anthropogenic Climate Change requires the planet to be unstable

Figure 2.13 overleaf summarises the answer to this question, the whole theory of Catastrophic Anthropogenic Climate Change is based on the fact that the planet's climatic systems are inherently unstable. A strong feed forward mechanism occurs, in

[140] For example: https://www.nature.com/articles/nclimate3004

[141] AR4 Climate Change 2007: The Physical Science Basis Section 8.6.2.3 page 631: https://www.ipcc.ch/site/assets/uploads/2018/05/ar4_wg1_full_report-1.pdf

that a small amount of warming from a rise in CO_2 concentrations occurs, this then leads to an increase in water vapour in the atmosphere, which is the dominant greenhouse gas, which in turn leads to a much larger rise by several orders of magnitude in the overall warming effect. In other words it is solely the postulated increase in water vapour in the atmosphere, which causes the catastrophe.

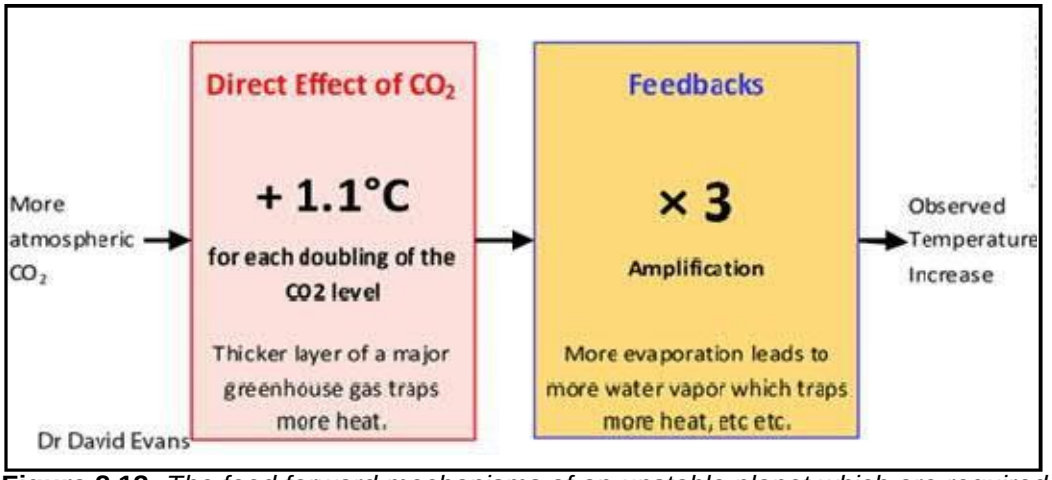


Figure 2.13: *The feed forward mechanisms of an unstable planet which are required for Catastrophic Anthropogenic Climate Change to occur*[142]

This then is the hypothesis on which the whole Catastrophic Anthropogenic Climate Change agenda was based, which from the onset was always widely disputed. Not least as there was an equally valid, less complex hypothesis, see Figure 2.14 below, which was based on the fact that; (a) the planet's climate has been stable over millennia, demonstrating that negative feedbacks dominate, while (b) the increased warming from doubling the CO_2 concentration is limited to about 2% of the net incoming solar radiation. Therefore, this small increase in temperature from the increasing CO_2 concentration would be effectively lost within the planet's natural feedback mechanisms. Indeed, as was previously articulated, such as the rain clouds in the tropics being just a little more active.

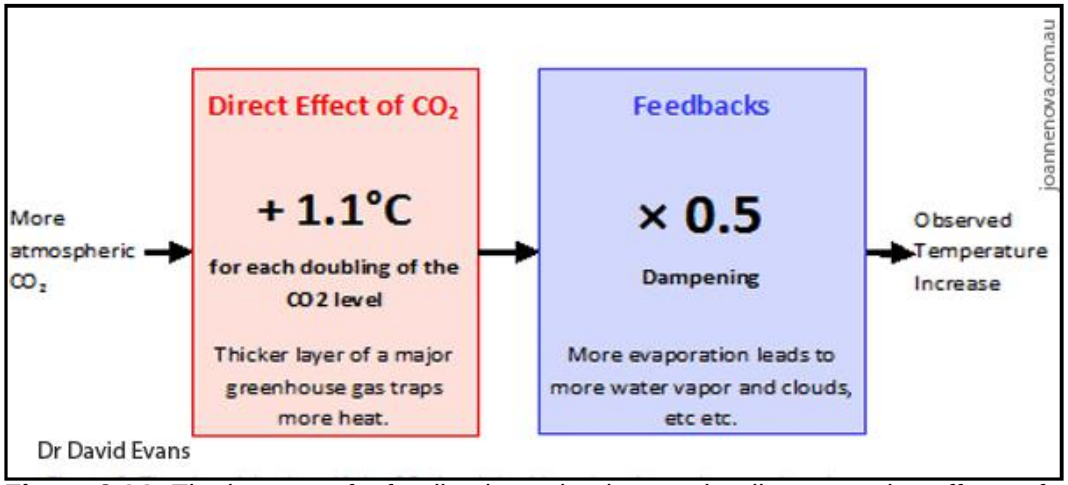


Figure 2.14: *The impacts of a feedback mechanism on the direct warming effects of CO_2*

[142] http://joannenova.com.au/2012/01/dr-david-evans-the-skeptics-case/

Richard S. Lindzen was Professor of Meteorology at the Massachusetts Institute of Technology until his retirement in 2013. While he worked on the earlier IPCC reports, he became a major critic of the politicised and alarmist position adopted. As he has often pointed out: Small percentage changes in either water vapour or clouds are fully capable of changing the infrared flux more than the changes induced by increased CO_2.[143] This increased warming from CO_2 is therefore just 'noise' when compared with the natural climatic variations which occur, such as in relation to snow cover, oceanic circulation, volcanic eruptions, etc.

As the American Chemical Society also explains:[144]

- *The addition of the non-condensable gases causes the temperature to increase and this leads to an increase in water vapor that further increases the temperature. This is an example of a positive feedback effect. The warming due to increasing non-condensable gases causes more water vapor to enter the atmosphere, which adds to the effect of the non-condensables.*

- *There is also a possibility that adding more water vapor to the atmosphere could produce a negative feedback effect. This could happen if more water vapor leads to more cloud formation. Clouds reflect sunlight and reduce the amount of energy that reaches the Earth's surface to warm it. If the amount of solar warming decreases, then the temperature of the Earth would decrease. In that case, the effect of adding more water vapor would be cooling rather than warming. But cloud cover does mean more condensed water in the atmosphere, making for a stronger greenhouse effect than non-condensed water vapor alone – it is warmer on a cloudy winter day than on a clear one. Thus the possible positive and negative feedbacks associated with increased water vapor and cloud formation can cancel one another out and complicate matters. The actual balance between them is an active area of climate science research.*

That the science was ever settled is preposterous. Until society develops a detailed knowledge of how clouds form and the energy and water vapour balances within them, the Global Circulation Models (GCMs) used by the IPCC will remain as nothing but academic toys, in which their outputs are entirely driven by the guesses used as input figures. As Figure 2.15 overleaf shows, after more than 30 years, we have got nowhere with these models, which continue to predict the same range of climate sensitivity as they did back in 1980s when the IPCC was founded. Furthermore, to reiterate what was previously articulated, the foundation of the IPCC was based on a political decision that Catastrophic Anthropogenic Climate Change was occurring, a decision taken before the science was ever robust enough to conclude that this was actually the case.

[143] https://www.thegwpf.org/content/uploads/2018/10/Lindzen-AnnualGWPF-lecture.pdf

[144] https://www.acs.org/content/acs/en/climatescience/climatesciencenarratives/its-water-vapor-not-the-co2.html

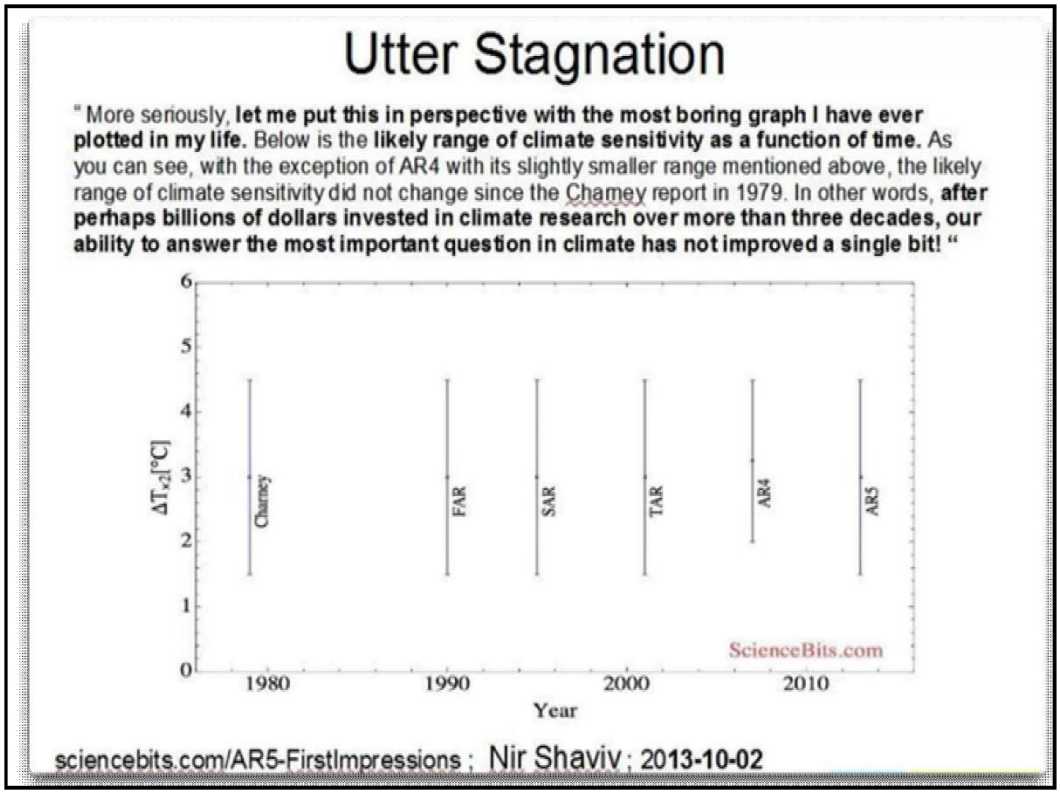


Figure 2.15: *More than thirty years of the range of predictions of climate sensitivity by Global Circulation Models used by the IPCC*

Despite the fact that these models are of such limited use, it is not as if we are entirely in a position of 'known unkowns'. For starters we have now reached a CO_2 concentration of 400 ppm, which given the logarithmic relationship shown in Figure 2.12, is about 45% of the climate sensitivity to be experienced. Not only are there no dramatic changes occurring, but the feed forward mechanism integral to the catastrophic warming shown in Figure 2.13, requires a significant increase in specific humidity to occur in the upper troposphere. Where the troposphere is the lowest region of the atmosphere, which extends from the earth's surface to a height of about 6–10 km, i.e. the region where jet aircraft fly. Yet satellite measurements are simply not showing this increase in water vapour content in the upper troposphere to be occurring. In fact a slight decrease is happening. While this position is being highlighted by a number of scientific papers,[145] it is being ignored by the politicised IPCC.

We also know from extended ice core data now stretching back to the ice age periods, ice ages which were caused by orbital changes in the planet that in these periods both the planet's temperature and CO_2 concentration changed quite dramatically. However, the critical feature is this data is that the CO_2 increase lagged temperature. In simple words the temperature increased and then this was followed in later years by an increase in CO_2. This indicates that as the oceans warmed, they degassed, and disapproves the theory that CO_2 led to the temperature increase.

[145] For example:
https://www.researchgate.net/publication/274956207_The_potency_of_carbon_dioxide_CO2_as_a_greenhouse_gas

In summary then to accept the hypothesis of Catastrophic Anthropogenic Climate Change is to accept that the small stubby tail can wag the big dog and that the planet's climatic systems are at a degree of instability, which defies our known knowledge based on the considerable evidence available to us. As a scientific hypothesis, it was widely speculative from the start, and given what we now know from the evidence in front of us, it can only be considered to be a hypothesis which is 'busted'. Simply put, Catastrophic Anthropogenic Climate Change only exists within highly flawed computer models and the minds of those, who want to believe it. There are far more balanced and realistic explanations for the real world around us, which are not obsessed with CO_2. Over the last thousands of years since the last ice age there have been subtle changes in the planet's climate and we would be well advised to concentrate our efforts to understand those first, before we go off making rash predictions.

2.7 The oceans drive the atmosphere and not the other way around

In their section on uncertainties in their AR5 report of 2013 the IPCC stated:[146]

- *"There are fundamental limits to just how precisely annual temperatures can be projected, because of the chaotic nature of the climate system. Furthermore, decadal-scale projections are sensitive to prevailing conditions—such as the temperature of the deep ocean—that are less well known. Some natural variability over decades arises from interactions between the ocean, atmosphere, land, biosphere and cryosphere, and is also linked to phenomena such as the El Niño-Southern Oscillation (ENSO) and the North Atlantic Oscillation".*

Oceans form more than 70% of the planet's surface and go to great depths. The heat absorbing capacity of the oceans is a thousand fold that of the atmosphere, which is not surprising given that water has a very high specific heat capacity. The biggest short term impact on global climate is the El Nino Southern Oscillation (ENSO), while the biggest medium term impacts are the Atlantic Multidecadal Oscillation (AMO) and the equivalent Pacific Multidecadal Oscillation (PDO). Indeed Met Eireann's own research paper on "*The influence of ocean variations on the climate of Ireland"* states:[147]

- *"The Atlantic multidecadal oscillation (AMO) explains over 90% of the pronounced decadal temperature and summer precipitation variation"*

The global circulation patterns are shown in idealised form in Figure 2.16 overleaf.

[146] Climate Change 2013 – The Physical Science Basis: Working Group I. See FAQ 1.1 on page 140:
https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf

[147] https://rmets.onlinelibrary.wiley.com/doi/full/10.1002/wea.2543

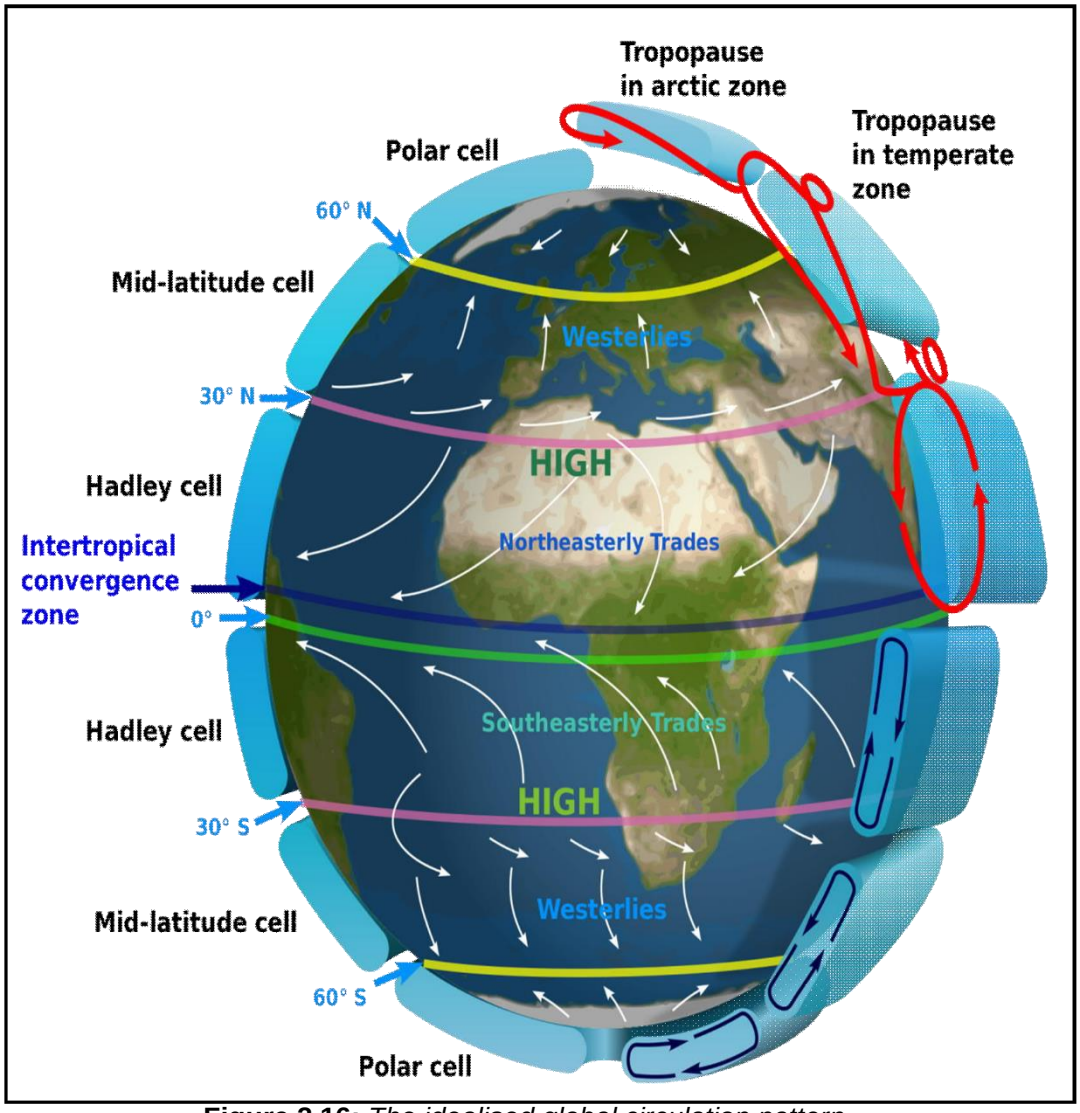


Figure 2.16: *The idealised global circulation pattern*

In simple terms the effect of these weather systems is to shift heat from the tropics to the poles, the poles radiating heat to space, particularly so in the period of winter darkness. However, these weather systems are constantly moving, not only due to seasonal changes, but there are also pattern shifts on a short and long term basis driven by oceanic effects. Figure 2.17 overleaf is a schematic of the El Nino Southern Oscillation (ENSO), which is the biggest short term impact on the planet's climatic systems.

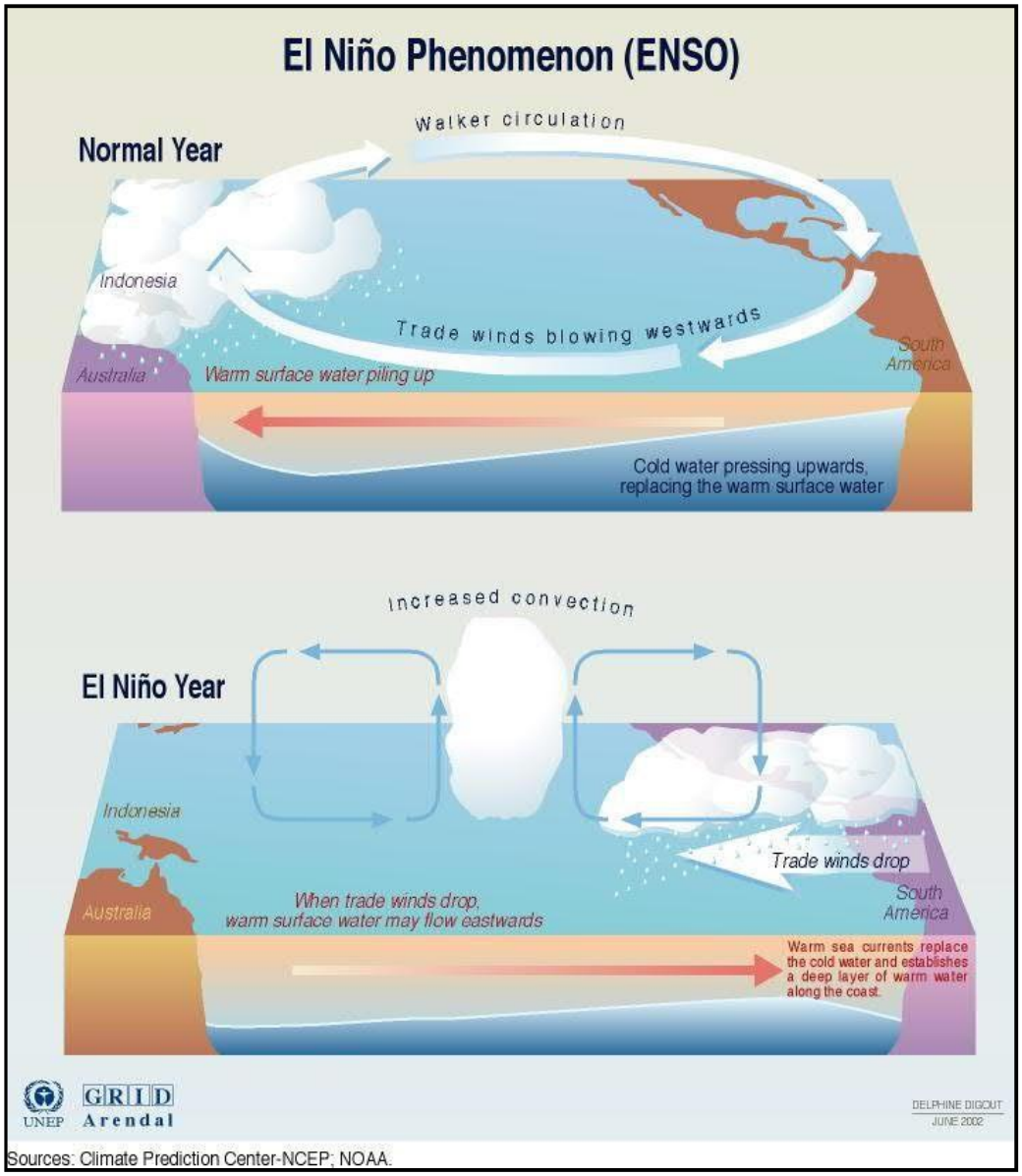


Figure 2.17: *Simple schematic of the El Nino Southern Oscillation (ENSO)*[148]

In a normal year the easterly trades blow across the Pacific leading warm water to pile up in the Western Pacific, where as a result what is known as the tropical convergence occurs, which is a band of active and vigorous thunderstorms. At the same time, cold water rises off the coast of South America and is blown to the West. Neither the intensity nor the timing of an El Nino can be predicted, but when it occurs there is a strong drop off in the Easterly trade winds allowing the warm surface water to 'slosh' back East into the Central Pacific or even as far back as the South American coast. As a result the weather patterns change over the whole Pacific and interrelated regions, as the zone of increased convection moves east into the Central and Eastern Pacific region. Parts of South America experience torrential rainfall, while rainfall is reduced in Australia and Indonesia.

[148] https://grimstad.uia.no/puls/climatechange/nns02/10nns02.htm

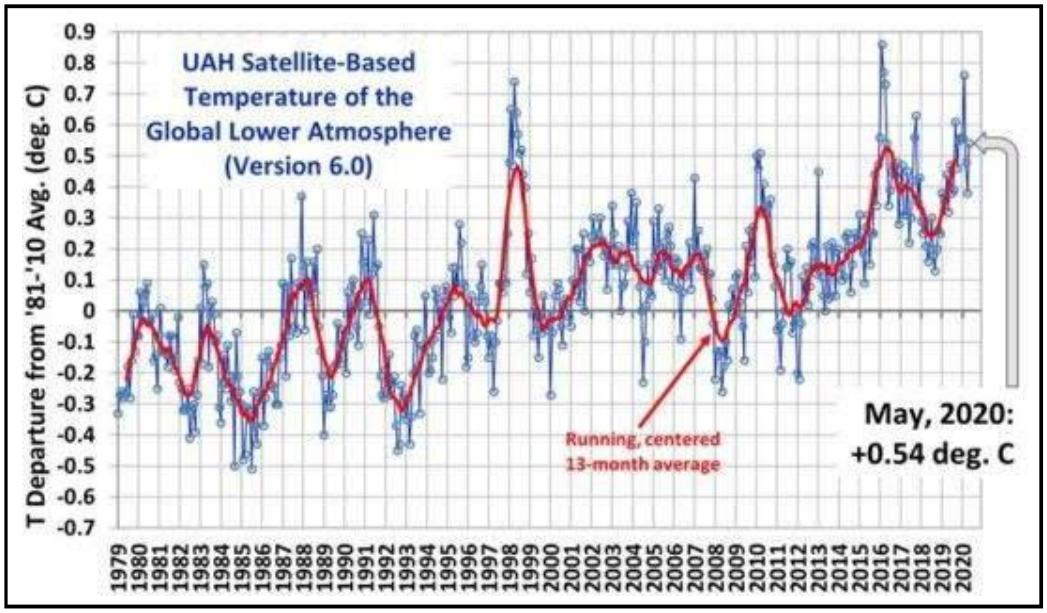


Figure 2.18: *Global satellite record showing peaks due to El Nino years*[149]

US satellites have being measuring global temperatures since 1979. This record is characterised by the El Nino years, 1999 and 2017 being particularly powerful El Nino years, as these El Nino years have acted like a pump, injecting ocean heat into the atmosphere to be dispersed to the poles. The aftermath of the El Nino is followed by La Nina, the cold phase of the El Niño Southern Oscillation, which is associated with cooler than average sea surface temperatures in the Central and Eastern tropical Pacific Ocean, see 'normal year' of previous Figure 2.17. The short term global temperature record is therefore driven by the alternating ENSO phases. Note: 2016 may have seen the biggest spike in global temperatures, due to an exceptionally powerful El Nino, but it was subsequently followed by steepest drop in temperatures every recorded.

2.8 The influence of the Meridional Overturning Current (MOC)

A (geographic) meridian (or line of longitude) runs North South on the planet's surface, as opposed to lines of latitude, which run East West. Figure 2.19 overleaf is a simplified representation of the Meriodional Overturning Current (MOC), which is like an enormous ocean heat conveyor. Every school child in Ireland learns about the Gulf Stream, but this is only the northerly and surface part of the Atlantic Thermohaline Circulation. This circulation is driven by both the prevailing winds and the density differences due to variations in temperature and salinity. Salinity is higher in the tropical regions where there is increased evaporation, while as the water is transported to the more polar regions of the North Atlantic, it cools and sinks. As a subsurface current it then returns to the South, completing the circulation pattern.

This is a complex pattern taking not just years, but centuries for the water exchange to occur. However, on a decadal level (over decades) there are some notable and repeatable changes.

[149] http://www.drroyspencer.com/latest-global-temperatures/

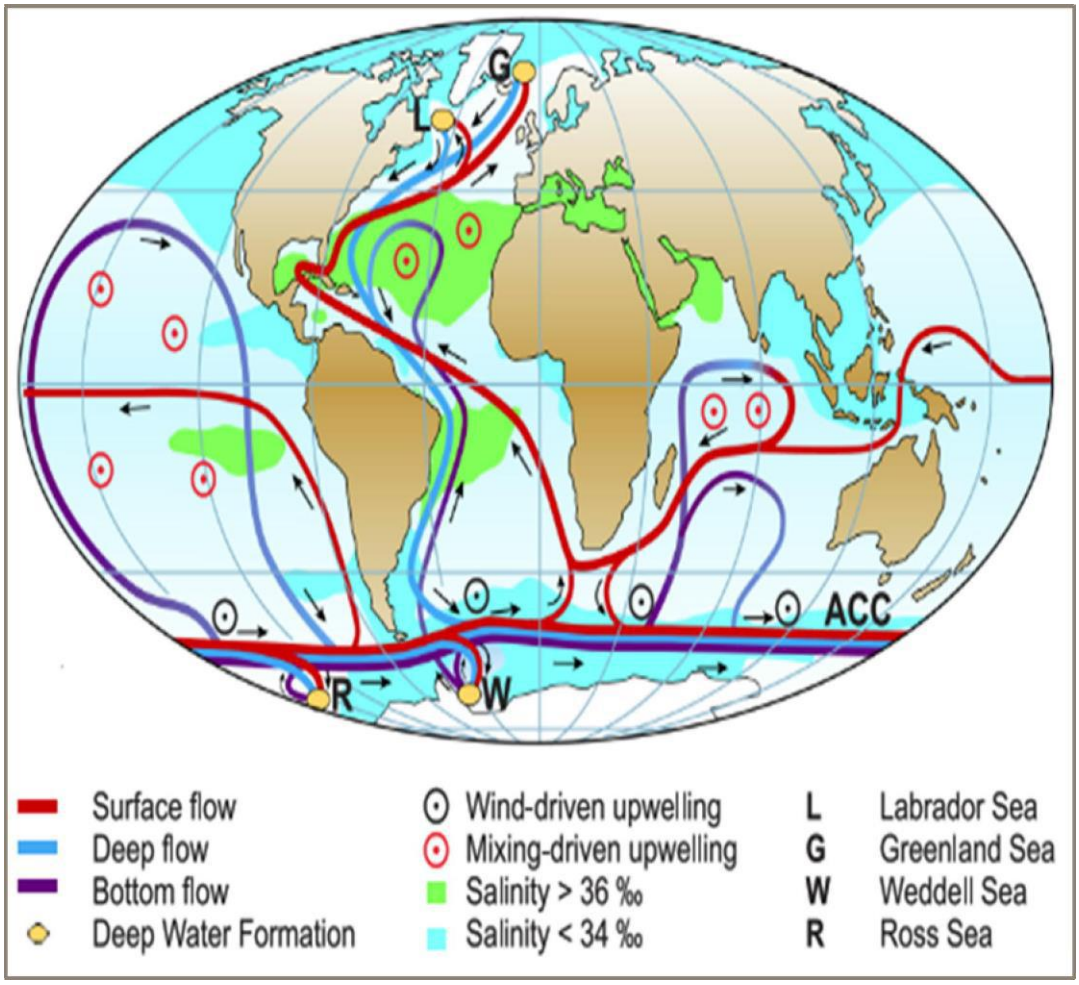


Figure 2.19: *Strongly simplified sketch of the global meridional overturning circulation*[150]

As previously mentioned, the Atlantic Multidecadal Oscillation (AMO) is considered by Met Eireann to be responsible for 90% of the decadal variation in Irish summer temperatures and precipitation. When the AMO is in its strong or positive phase, the North Atlantic sea surface temperatures are warmer as the Thermohaline Circulation is strong. During the negative (weak) phase of the AMO, the North Atlantic sea surface temperatures are colder. Both the AMO and equivalent Pacific Decadal Oscillation (PDO)[151] have been known for centuries due to their impacts on fish stocks.

[150] Thesis of Jacob Schewe "The role of Southern Ocean winds for the global meridional overturning circulation in the Earth System Model of Intermediate Complexity CLIMBER-3α" http://www.pik-potsdam.de/~schewe/publications/dpeffect.pdf

[151] https://www.sciencedirect.com/topics/earth-and-planetary-sciences/pacific-decadal-oscillation

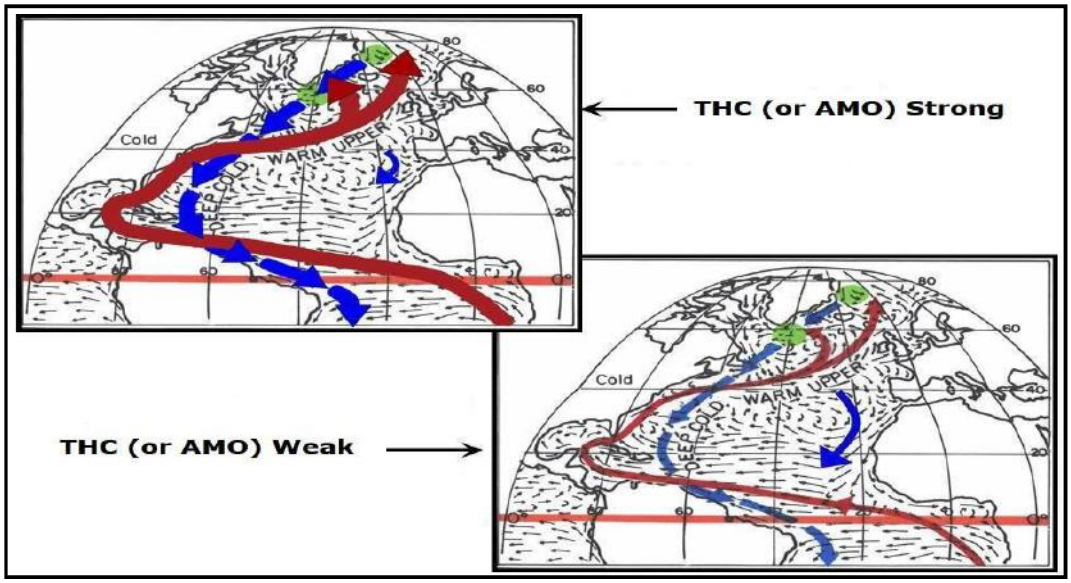


Figure 2.20: *Simplified schematic of the Atlantic Multidecadal Oscillation (AMO) which is due to changes in the Thermohaline Circulation (THC)*[152]

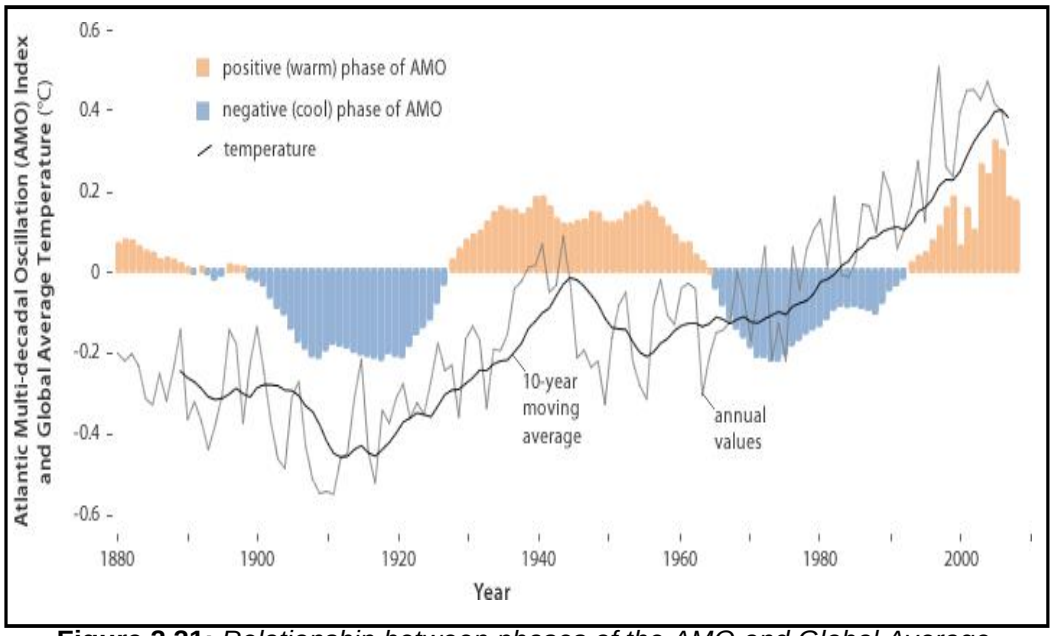


Figure 2.21: *Relationship between phases of the AMO and Global Average temperature (º C)*[153]

The AMO follows an approximately thirty year pattern of a positive warm phase followed by a negative cold phase, which correlates with the undulating cycle to be seen in the Armagh temperature record, see previous Figure 2.2. The above Figure 2.21 shows the relationship between the phases of the AMO and global average temperatures. It is not an exact relationship, but positive phases of the AMO do seem to be leading to an increase in temperatures.

[152] https://tropical.colostate.edu/media/sites/111/2018/01/Bill-Gray-Climate-Change.pdf

[153] https://www.climate.gov/news-features/features/short-term-cooling-warming-planet

However, one must remember that the Atlantic is but only one of two large oceans. Figure 2.22 below shows what happens when the AMO is represented along with the PDO.

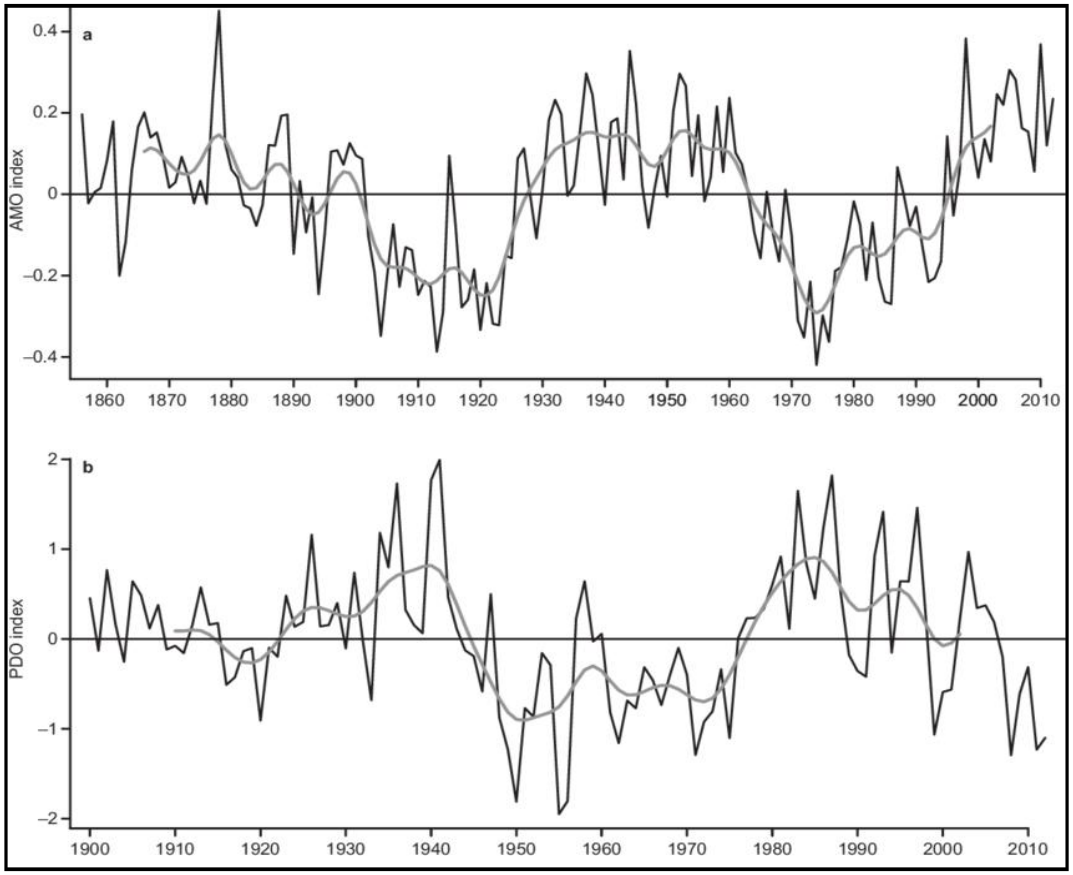


Figure 2.22: *AMO Index top graph and PDO Index bottom graph*[154]

Both the AMO and the PDO have the potential to overlap in both their warm and cold phases, therefore along with the El Nino Southern Oscillation being a major driver of global temperature change.

The North Atlantic Oscillation (NAO) index is the difference in atmospheric pressure between the Icelandic Low and the Azores High.[155] As such it constantly varies on a daily basis, but trends can be seen. It is also the index, which is most important in describing and determining the weather patterns in North Western Europe, see Figure 2.23 overleaf.

[154] https://www.researchgate.net/figure/a-Atlantic-Multi-decadal-Oscillation-AMO-index-defined-as-detrended-North-Atlantic_fig1_282846396

[155] https://www.cpc.ncep.noaa.gov/data/teledoc/nao.shtml

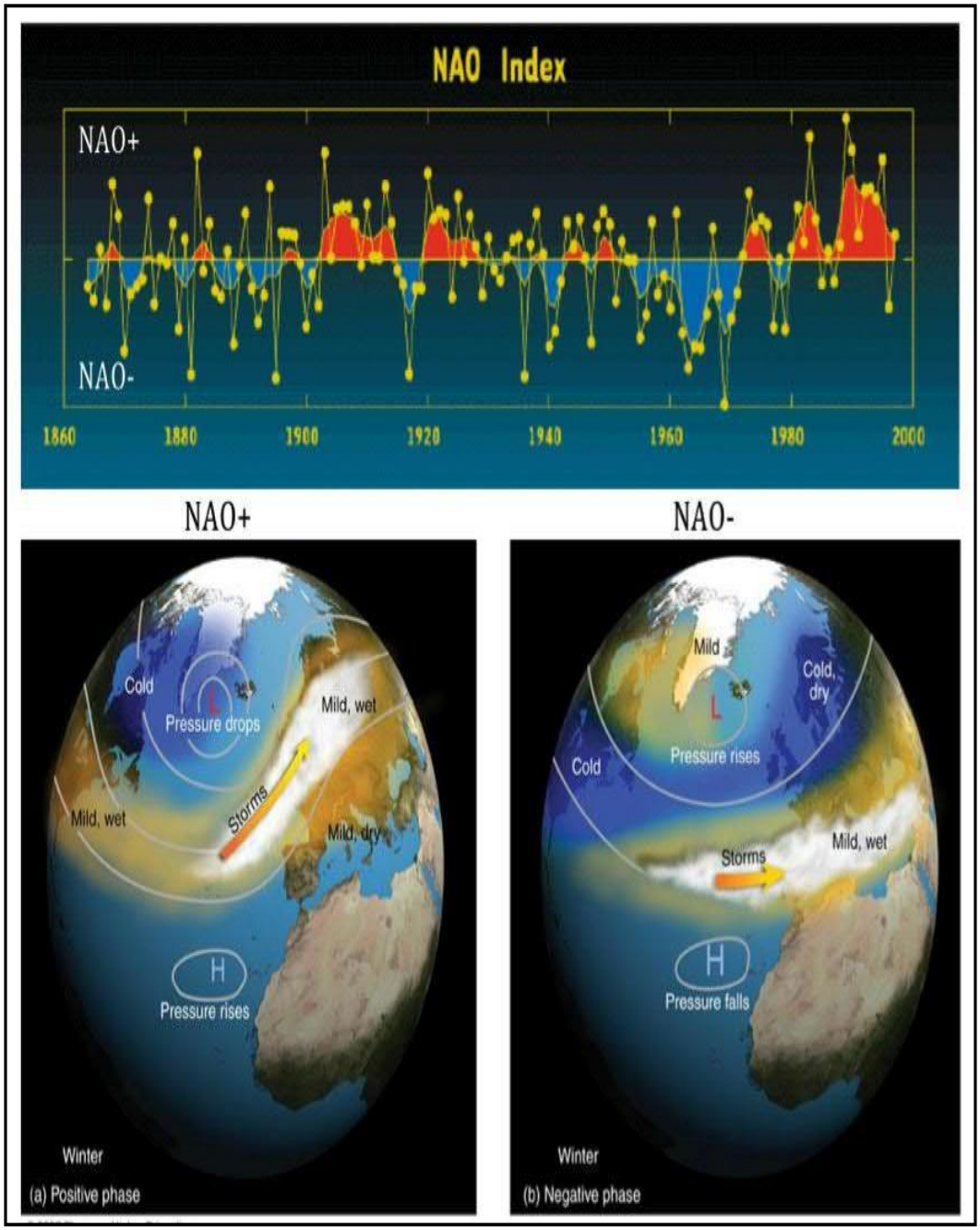


Figure 2.23: *Schematic representation of NAO Index and variations since 1860*

When the NAO is in the positive phase in winter, the jetstream is strong and a succession of low pressures route into North Western Europe resulting in mild, wet and windy weather. When the NAO is in the negative phase in winter, the jetstream is located further south, such that the low pressures tend to move into the Mediterranean, while high pressure builds in North Western Europe leading to cold and dry conditions. The NAO also tends to show a cyclical pattern, which is linked to the phases of the AMO.

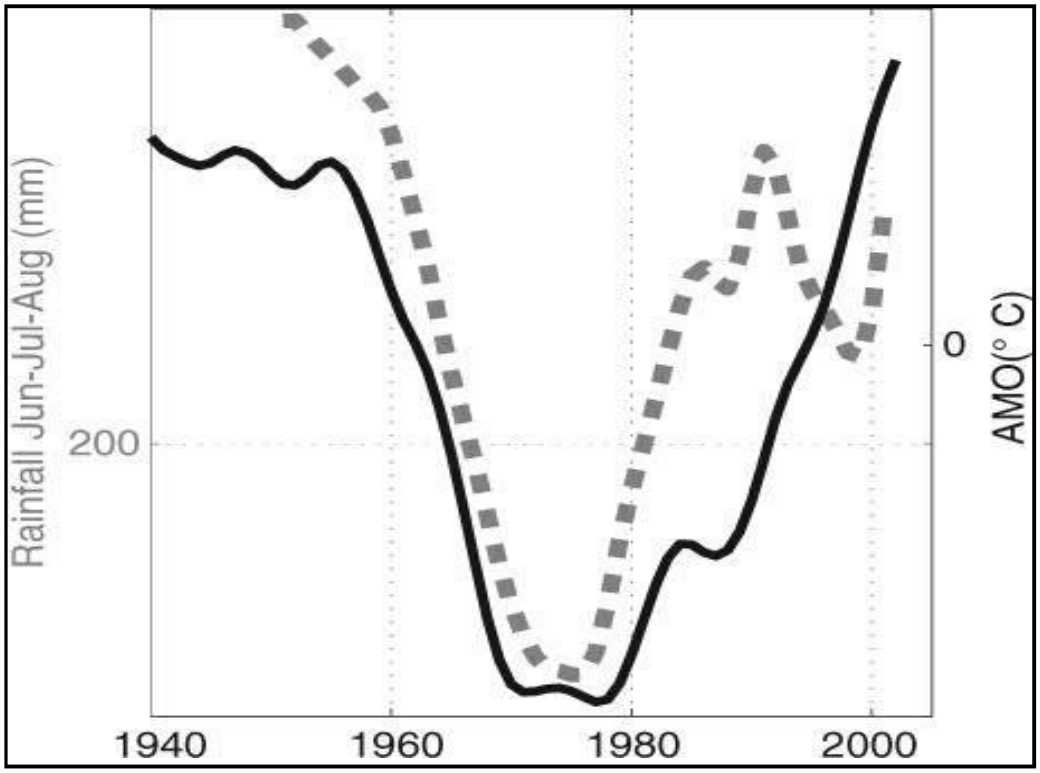


Figure 2.24: *Met Eireann Research Paper – Correlation between Irish summer rainfall and phases of the AMO*[156]

Figure 2.24 is taken from the same Met Eireann research paper on: *"The influence of ocean variations on the climate of Ireland".* As can be seen when the AMO is negative, Irish summer weather is characterised by drier conditions, as the low pressures coming in from the Atlantic are fewer and less active. This can be explained by the cooler sea surface temperatures of the cold negative phase, as opposed to the warmer sea surface temperature of the positive phase, the latter which undoubtedly results in more moisture in the atmosphere.

The Sahel is the sub-Saharan region, which is known to experience drought conditions during the negative phase of the AMO.[157] It is not surpring that Band-Aid in 1984, which was a response to terrible drought conditions in that region and resulting starvation, occurred after several years of the impact of a negative AMO. Since then the scientific literature is full of references to the greening of the Sahel, which is partly due to the fact that we have subsequently been in the positive phase of the AMO. It is also known that the number of tropical storms, which mature into severe hurricanes, is much greater during warm phases of the AMO than during the cooler phases, which is logical given that the increased sea sufrace temperatures in the warm phase provide more energy to cyclonic development.

[156] https://rmets.onlinelibrary.wiley.com/doi/full/10.1002/wea.2543

[157] https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2006GL026267

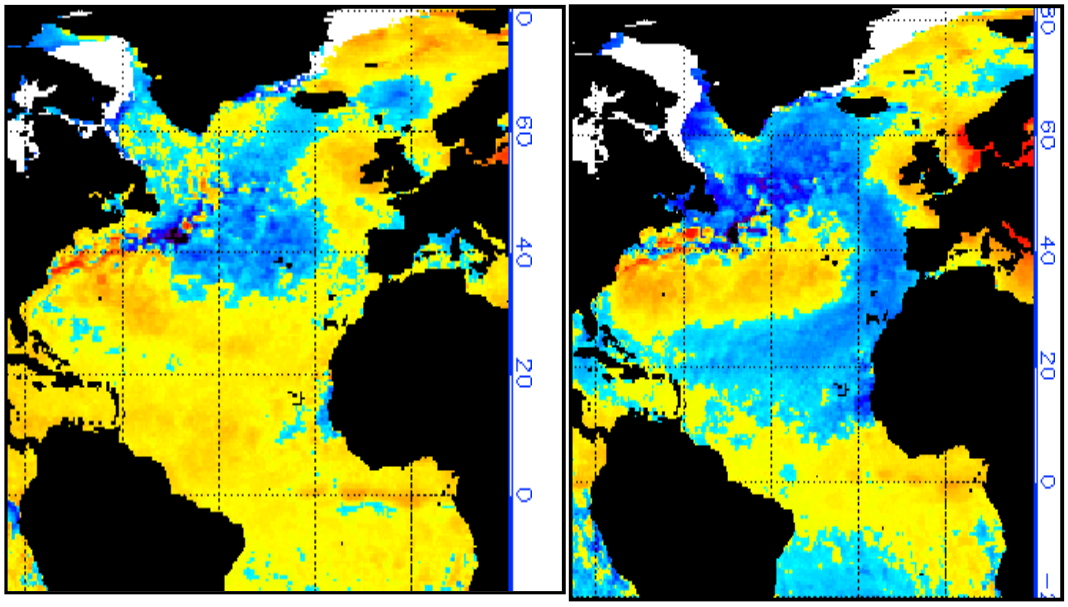


Figure 2.25: *Atlantic sea surface temperature anamolies; June 2016 on the left and June 2018 on the right*[158]

Figure 2.25 shows the change, which occurred in Atlantic sea surface temperatures in the period June 2016 to June 2018. Increasingly it is commented on in the scientific literature that the AMO is now showing indications of turning negative again.[159] Are we to see a greater frequency of warmer and drier summers in Ireland? Certainly 1974 and 1976 were 'stand out' summers, while 2018 didn't disappoint. Did the colder sea surface temperatures play a role? There are many meteorologists who appear to think so.

Clearly there are known oceanic climate cycles, which have major impacts on the weather of North Western Europe and as far south as the Sahel, but this impact also goes further north to the Arctic.

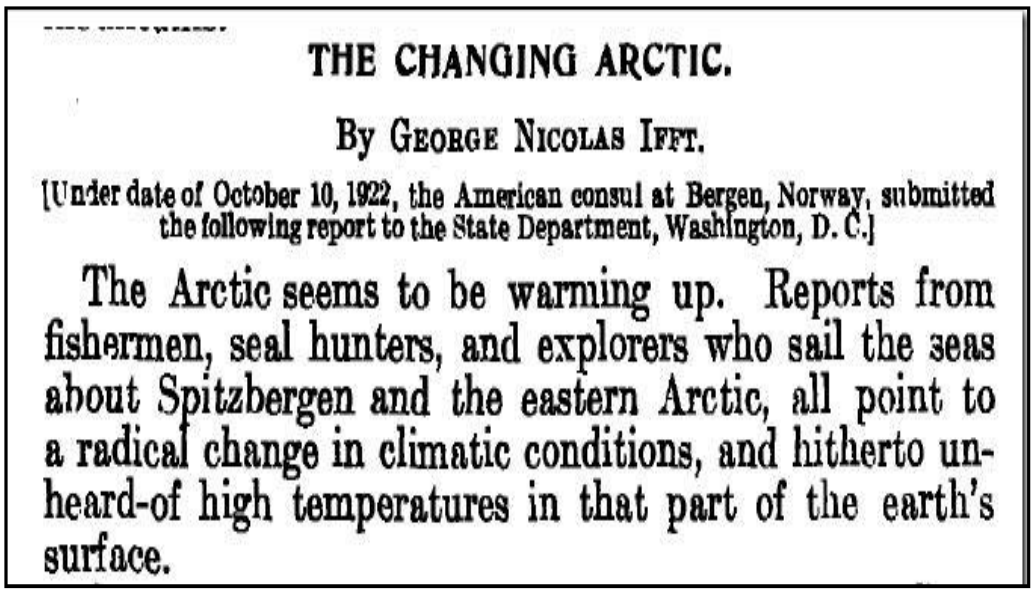
2.9 The Arctic ice is melting – again

The melting of sea ice in the Arctic is the 'poster child' of activists promoting Catastrophic Anthropogenic Climate Change. However, this is worthy of more detailed examination. The sea ice obviously grows during the depth of the Arctic winter when there is little or no sunlight, while in the summer there is a melting phase as sunlight reaches the ice twenty four hours a day. In the more northerly areas, some ice is multi-annual in that it surives the summer melt. It is the extent of this remaining summer ice, which is the clarion call, in that it is frequently projected that because of global warming the Arctic will become ice free. Indeed, as many point out with justification, the Arctic should according to these predictions have been ice free several years ago, but it most certainly isn't.[160] However, new revised predictions can always be made for several years hence, 'as the show must kept on the road'.

[158] https://www.ospo.noaa.gov/Products/ocean/sst/anomaly/

[159] https://www.nature.com/articles/s41598-017-11046-x

[160] https://notrickszone.com/2018/07/21/charlatans-of-the-arctic-laughing-stock-ice-free-arctic-predictions-fake-science-at-its-best/



THE CHANGING ARCTIC.

By George Nicolas Ifft.

[Under date of October 10, 1922, the American consul at Bergen, Norway, submitted the following report to the State Department, Washington, D. C.]

The Arctic seems to be warming up. Reports from fishermen, seal hunters, and explorers who sail the seas about Spitzbergen and the eastern Arctic, all point to a radical change in climatic conditions, and hitherto unheard-of high temperatures in that part of the earth's surface.

Figure 2.26: *Report of American consul in Norway to the U.S. State Department in October 1922 and published in the Monthly Weather Review*[161]

Howver, it is not the first time that the Arctic has warmed up and that this has 'hit the papers'. A warming occurred in the 1920s and 1930s as the above Figure 2.26 documents. This was then followed by a cooling phase particularly so in the 1960s and 1970s, when pack ice increased. An astute observer would notice that the Arctic is barely open to the Pacific, as the Bering Strait is quite narrow, while it is very open to the influence of the North Atlantic. The warming and cooling phases described above clearly match those of the phases of the AMO, while the rate of ice melt is determined by the water temperature below it rather than the air temperature above it.

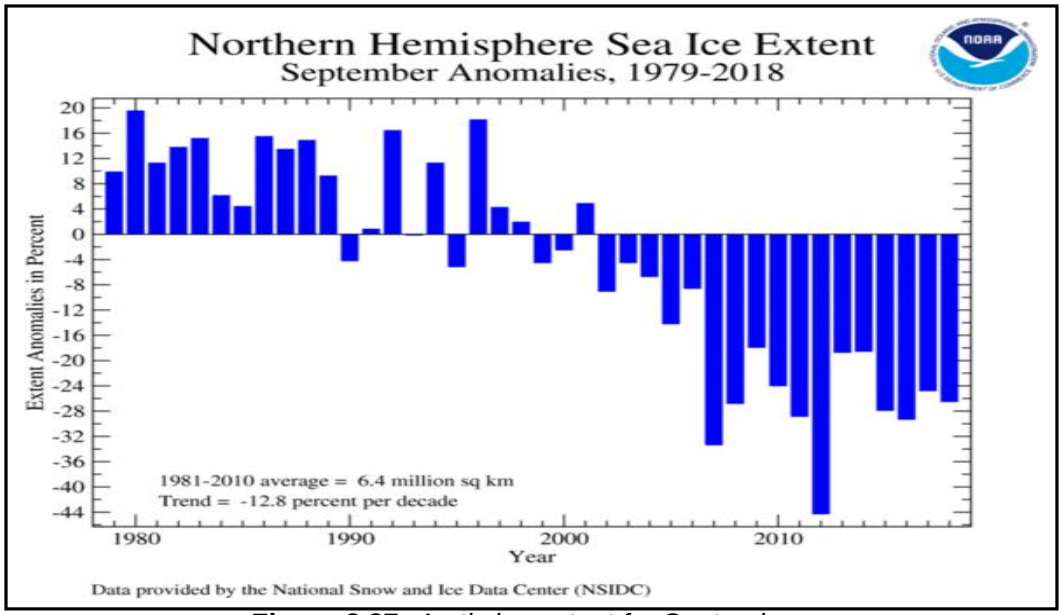


Figure 2.27: *Arctic ice extent for September*

[161] See also: http://www.climate4you.com/ClimateAndHistory%201900-1949.htm

Figure 2.27 above is a graphical representation of the change in Arctic sea ice for the month of September, which is when it is at its minimum following the Summer melt. Early satellites started measuring such sea ice extent in 1975 during the cold AMO, when it was at its maximum, while the reduction in sea ice can be attributed to the warm phase of the AMO. Summer storms, as happened in 2012, break up the ice floes, such that they are not then registered as pack ice by the satellite measurement. In general, while there was an initial decrease in summer sea ice extent, it has leveled off and the expectation is that as we move back into the cold phase of the AMO, it will increase again. It is also noteworthy that over the same period, Antarctic sea ice extent has shown little change.

2.10 Why temperature is a poor indicator of warming

Chemical engineers and others, who do heat transfer calculations, know that the relationship between temperature and energy input is complex, particularly so when one is dealing with air. At -35 ºC air is extremely dry and the saturated concentration corresponds to 0.2 g/m^3. However, when air is at a temperature of +35 ºC air is moist and humid and the saturated concentration corresponds to 40 g/m^3.[162] This is a difference of a factor of 200, which given that water vapour has a very high specific heat capacity much greater than that of dry air, has a major impact on the resulting energy balance. In fact the energy input to raise 35 ºC saturated air by one degree is 6.4 times higher than raising air at -35 ºC by one degree. Alternatively one can express this as the fact that if moist air moves up from the South into the polar regions in winter, the temperature will spike.

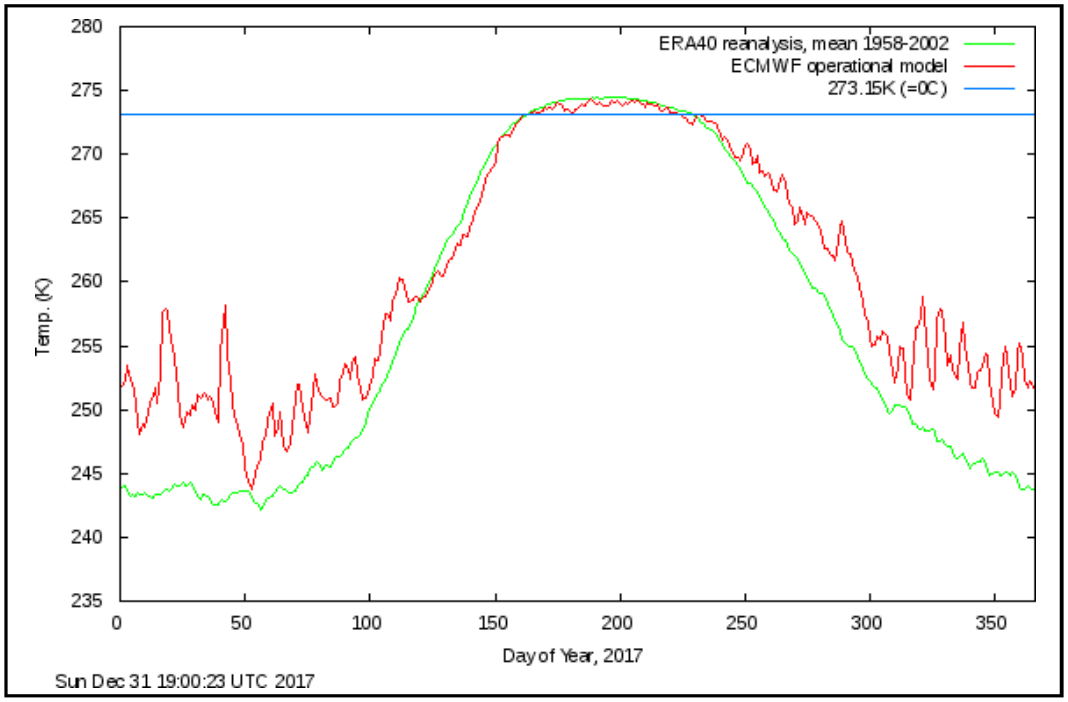


Figure 2.28: *Temperature record of Arctic for 2017 in degress Kelvin (273 ºK = 0 ºC) in red with long term average (1958-2002) shown in green*[163]

[162] http://www.uigi.com/WebPsycH.html

[163] http://ocean.dmi.dk/arctic/meant80n.uk.php

What the above record shows is that during the winter months the average temperature in the Arctic on the long term record has been about 245 ºK = -28 ºC. However, recent years have shown an increase in temperature in winter months as moisture has moved in from the South, which has also led to significantly increased snow over Greenland.[164] In summer there has been little if any change, the air is warmer anyhow, so is capable of carrying the mositure without a temperature spike.

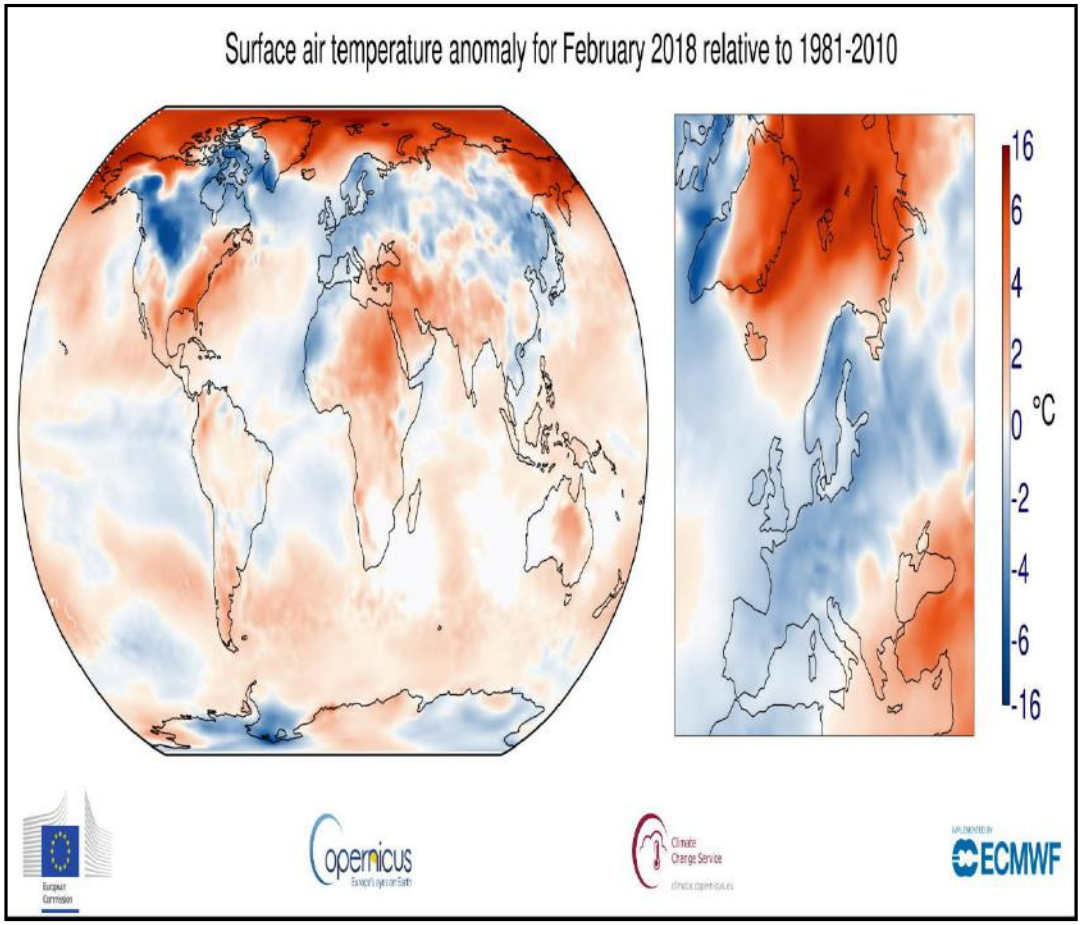


Figure 2.29: *Air temperatures anomaly for February 2018 versus long term record 1981-2010*[165]

This then begs the question, is everywhere else warming up as well. Figure 2.29 is a snaphop of global temperature anomalies for February 2018 (the period of the famous 'Beast from the East'). It is typical of recent winters in the Northern Hemisphere in that it is clearly visible as to how the Artic region was warmer than the period 1981 to 2010. However, the rest of the planet was a bit of a 'mixed bag', some regions somewhat colder while others were somewhat warmer.

Figure 2.30 overleaf is the satellite temperature record on a regional basis for the period 2016 to 2018. As can be clearly seen, the only place which is showing a temperature increase is the winters in the Arctic.

[164] http://polarportal.dk/en/news/news/heavy-snowfall-in-greenland/

[165] https://climate.copernicus.eu/surface-air-temperature-october-2018

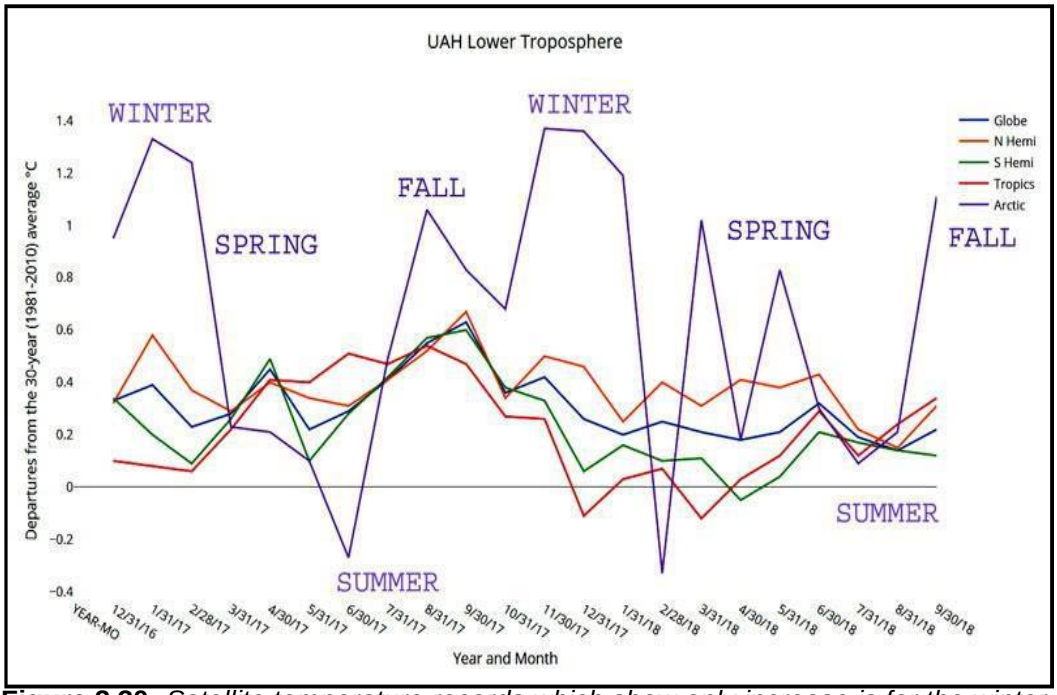


Figure 2.30: *Satellite temperature records which show only increase is for the winter in the Arctic (period 2016 to to 2018)*

This complex relationship means a number of things, first as to how this 'global temperature' value is of limited use in assessing, as to if the planet is warming by any significant amount. Heat flows around the planet, from the oceans to the atmosphere and from the tropics to the poles, the latter both by the weather systems and the oceanic currents. The very act of shifting some atmospheric heat from the tropics to the poles in itself can cause a rise in the global temperature, due to this heat spike in the Arctic, without there even being a net gain in heat energy in the atmosphere. Furthermore, the fact that as we can now see above, that any recent global temperature increase is being predominately driven by the winter situation in the Arctic, means that any net heat gain in the planet is being exaggerated by this effect.

In reality we have seen two powerful El Ninos in recent years, see Figure 2.18, which have pumped moisture into the atmosphere. This has now made its way to the poles, where it is being radiated out. It is also fascinating to see the additional dynamics in this process, in which there has been a trend back to increased winter snow cover in the Northern Hemisphere in recent years.[166] Snow cover has a strong albedo, which is a cooling feedback in winter, while the increased snow melt in spring and summer causes a influx of colder water into the Arctic ocean, which is again a negative feedback.

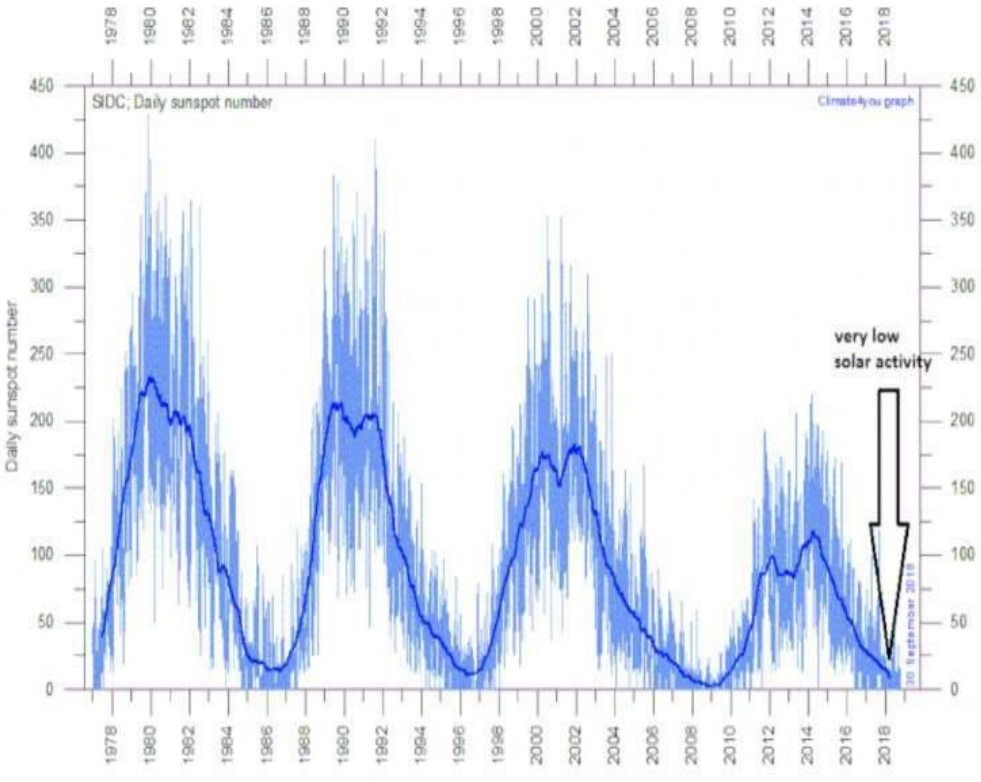
We don't have sufficient data to understand these natural cycles and feedbacks, but the point to be made is that they are feedbacks. Nature tends to be self-correcting, with negative feedbacks. It is like the ball in the middle of the bowl. Roll it up the side and the natural forces will then act to roll it back towards the centre. Nature abhors positive feedbacks where issues run out of control, such as the ball at the top of a slope, which accelerates as it runs downhill.

[166] Northern Hemisphere Snow Cover, 2018-2019: https://globalcryospherewatch.org/assessments/snow/2019/

2.11 The sun is the biggest driver of the climate – and it varies

A constant criticism of the IPCC is that it is 'one trick pony', in which the only game in town is CO_2, while realistically there are a large number of variables, which can all impact to a significant degree on climate. The World Meteorological Organisation listing some sixteen essential climate variables.[167] As Figure 2.10 shows, the sun is the biggest input to the global heat balance and that input varies.

An 'active sun' is when the sunspot count is high, while a 'quiet sun' is when the sunspot count is low. As Figure 2.31 shows, we are currently in a period of transition. There are sunspot cycles of the order of eleven years, while on a longer timeframe the intensity of these sunspot cycles can vary quite dramatically. The 20th Century up to the period of 2005 was characteristed by very active sunspot cycles, but we are now rapidly moving into a period of a much quieter sun. Indeed, in early 2019, the sun has been blank without any sunspots for weeks on end.



This plot shows the daily observations of the number of sunspots during the last four solar cycles back to 1 January 1977 according to Solar Influences Data Analysis Center (SIDC). The thin blue line indicates the daily sunspot number, while the dark blue line indicates the running annual average. The current low sunspot activity is indicated by the arrow at the lower right of the plot. Last day shown: 30 Sep 2018. Data source: climate4you.com.

Figure 2.31: *Sunspot cycles for period 1977 to September 2018*

[167] https://public.wmo.int/en/programmes/global-climate-observing-system/essential-climate-variables

As far as our knowledge goes, and in this case our actual measurements are limited, the Total Solar Irradiance (TSI), which is the total energy reaching the planet's atmosphere, does not vary much between an active sun with significant sunspots and a quiet sun with few sunspots.[168] Indeed, many consider that variance in TSI to be around 0.1%. However, other changes are occurring, in that during the active sun:

- The sun's magnetic field is considerably stronger. This shields the earth from the cosmic radiation, which is bombarding us from deep space. Hence less cosmic radiation enters the earth's atmosphere in an active sun.
- While the TSI varies little, the solar Extreme Ultraviolet (EUV) radiation increases by a factor of ten. This causes the Earth's upper atmosphere to expand.

Conversely during a quiet sun:

- The sun's magnetic field weakens and more cosmic radiation reaches the earth's atmosphere.
- The EUV decreases by a factor of ten, with the result that the upper atmosphere significantly contracts. Indeed, this can be seen by the fact that many satellites, which have little or no fuel, such as the Hubble telescope, are currently still in orbit several years after they were expected to be.[169]

Sunspot cycles can, to a degree, be forecasted from planetary motions, while historical values can be deducted from isotopes.

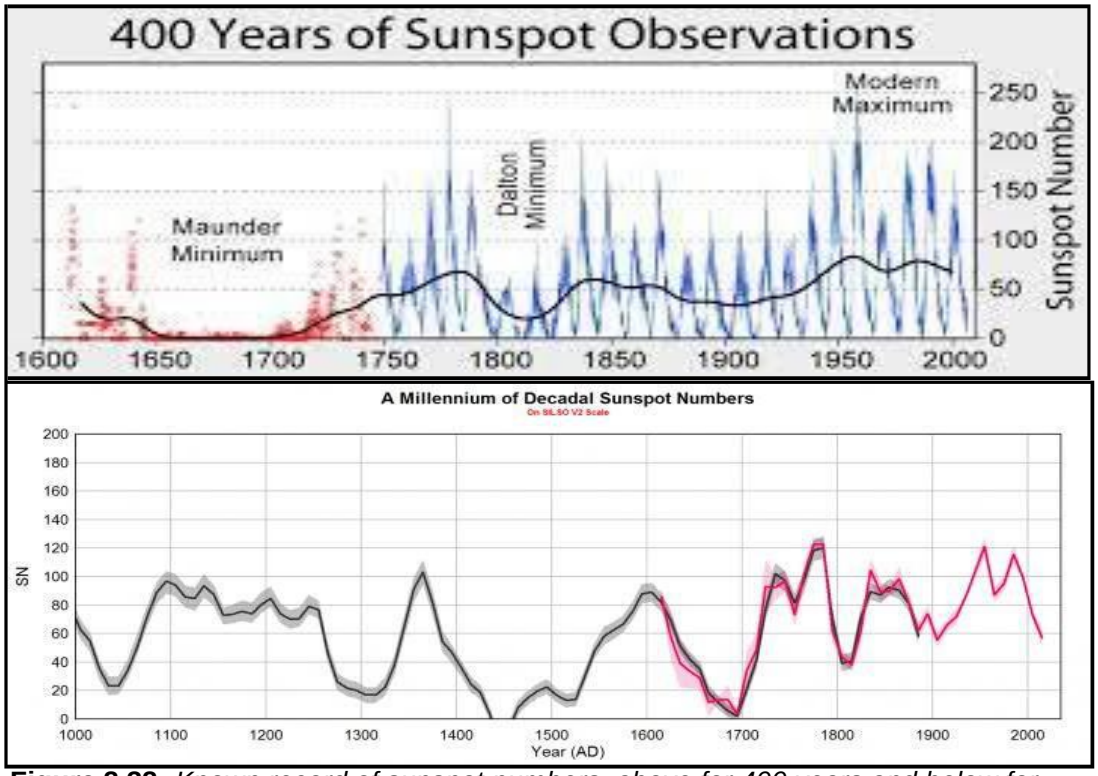


Figure 2.32: *Known record of sunspot numbers, above for 400 years and below for 1,000 years*

[168] https://arxiv.org/ftp/arxiv/papers/1601/1601.05397.pdf

[169] https://earthobservatory.nasa.gov/features/OrbitsCatalog/page3.php

The English astronomer William Herschel (1788 – 1822) achieved notoriety for pointing out that: “Sunspots correlated with wheat prices”. The ‘Mauder Minimum’ above in Figure 2.32 also corresponded with the ‘Little Ice Age’ in which climatic conditions were tough and food often short due to poor agriculture yields, see H.H. Lamb’s book previously referenced in Section 2.2 for more details. Increasing sunspot numbers subsequently led to improved climatic conditions and a more bountiful harvest.[170] Indeed, there is no denying that there is a correlation between the climatic shifts discussed previously in Section 2.2 and the sunspot record.

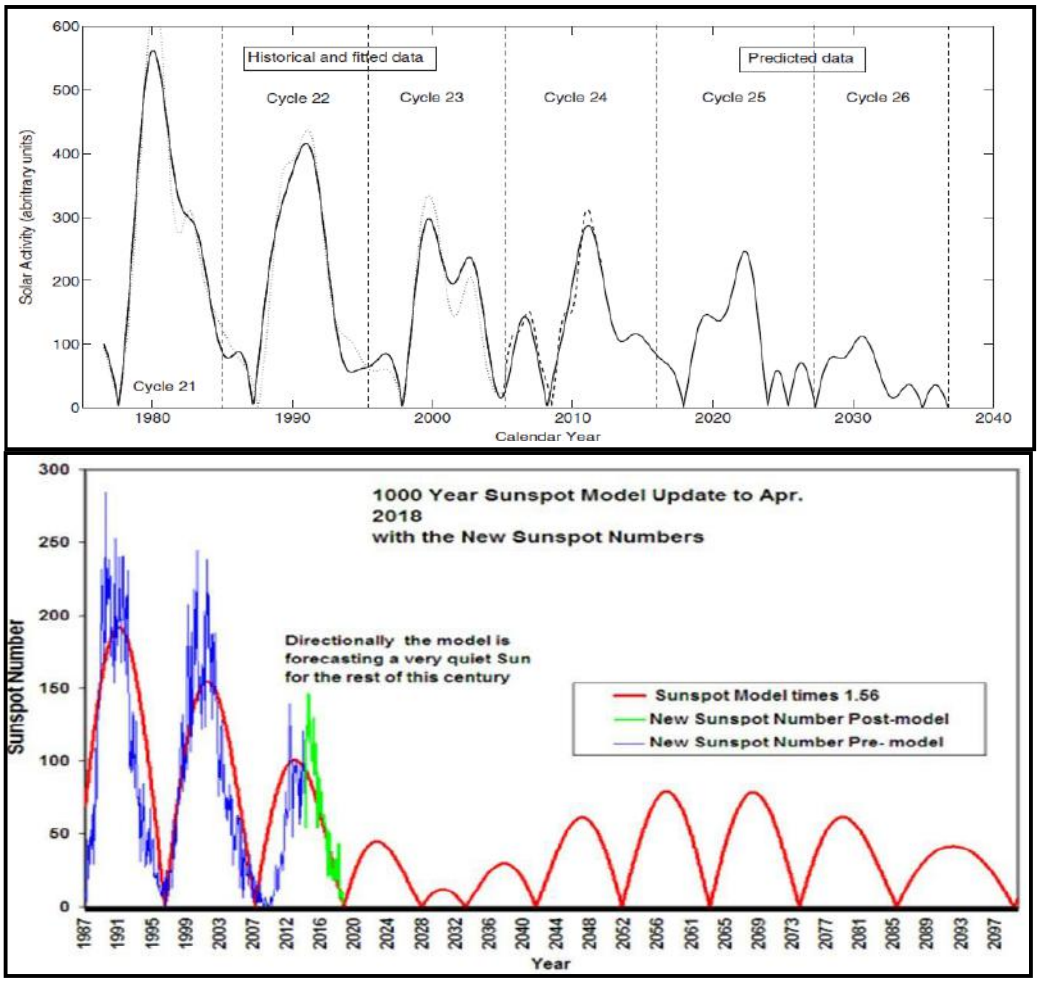


Figure 2.33: *Different predictions for future sunspot cycles; top graph out to 2040 and bottom graph to 2100*[171]

As Figure 2.33 shows the period of an intensely active sun, which was characteristic of the 20th Century, has come to an end and the next decades are going to exhibit a sun with far quieter characteristics. We are, whether we like it or not, in a period of change and transition.

[170] https://www.nature.com/news/2003/031215/full/news031215-12.html

[171] See for example: https://tallbloke.wordpress.com/2018/11/05/valentina-zharkova-incorporates-planetary-theory-into-solar-activity-model/ and https://tallbloke.wordpress.com/2018/06/09/leif-svalgaard-reveals-his-solar-cycle-25-prediction-at-last/

2.12 The polar vortex and outbreaks of intense winter cold

The polar vortex is nothing new, it has been known since 1853, but it has been 'hitting the headlines' in recent Northern Hemisphere winters. See Figure 2.34 below for a description.

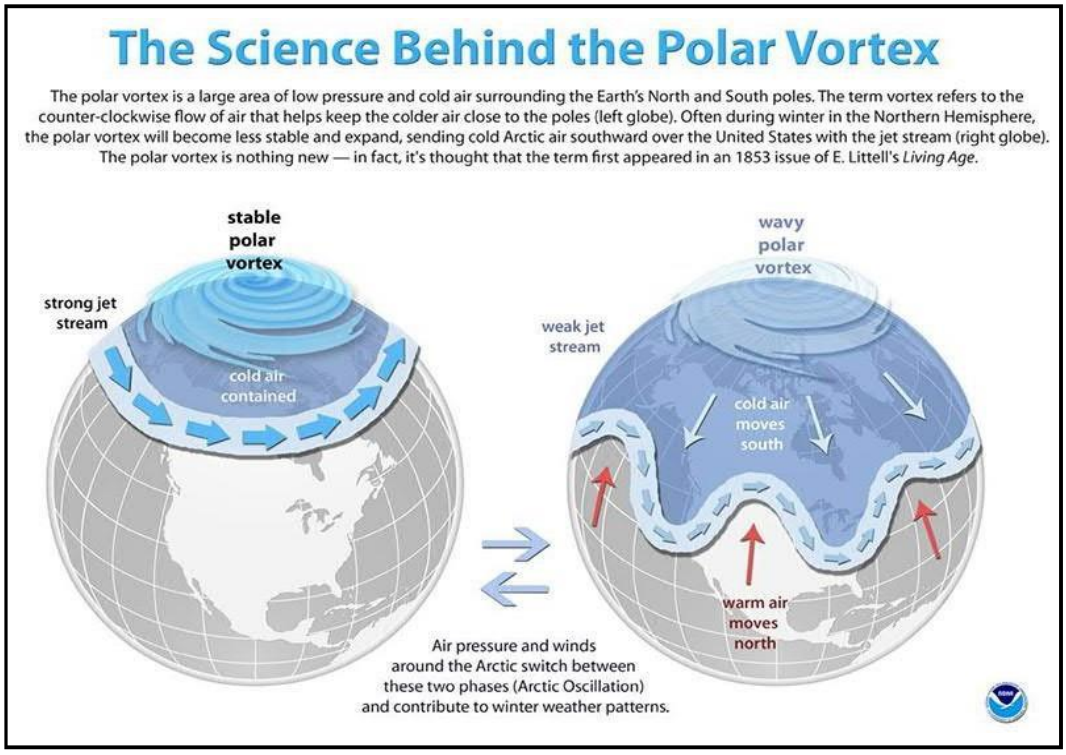


Figure 2.34: *Description of the Polar Vortx, coutesy NOAA*[172]

Winters in the Northern Hemisphere can be 'zonal' see schematic on the left, with a strong jet stream and resulting positive NAO (see figure 2.23). Such winters are in North Western Europe mild, wet and windy. However, the polar vortex can break down and what are known as 'Rossby Waves' form in the jetstream.[173] In other words it kinks, as is shown in the schematic on the right, in that warm air moves North and cold Arctic air can rush South, the consequences of the latter we all know. In many cases with resulting cold to very cold Easterly winds associated with a negative NAO.

The troposhere, as was explained previously, is the layer of the atmosphere from ground level to about 6 to 10 km, i.e. where jet aircraft fly and clouds are to be found. Above it is the stratosphere. Ozone in the stratosphere is what water vapour is to lower down in the troposphere, i.e. the differences in ozone concentration drive the circulation. All of this is very complex, not least as we have only had weather ballons taking measurements in the stratosphere since the 1950s. However, we do know that in the Arctic, changes in the stratosphere can impact on the troposhere below and cause the polar vortex to become weak and even split, see schematic above on the right.

[172] https://www.noaa.gov/multimedia/infographic/science-behind-polar-vortex

[173] https://oceanservice.noaa.gov/facts/rossby-wave.html

Changes in the sun are, as previously highlighted, more pronounced in the UV spectrum. This impacts on the ozone balance in the stratosphere, the degree of which is still being researched,[174] but it is seen to have an impact on the NAO.[175] Furthermore, a Sudden Stratospheric Warming (SSW) is one of the most radical changes of weather that is observed on our planet, as the stratosphere in the winter Arctic rapidly warms up. In most but not all cases this propogates down into the troposphere, causing the winds (polar night jet) holding the polar vortex to break down and an outbreak of very cold air to pour South, such as in 1963, 1982, 2018 and 2019.

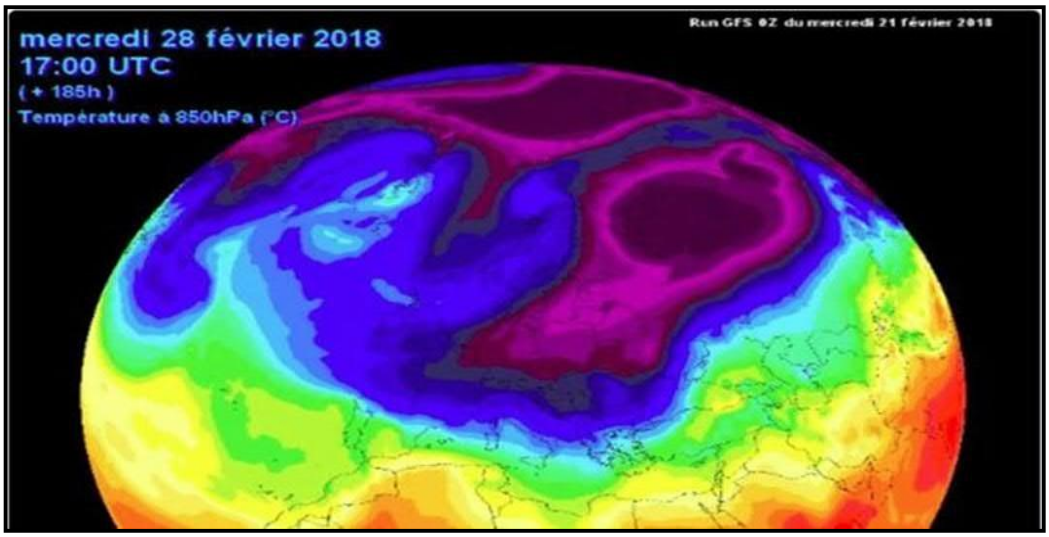


Figure 2.35: *Polar vortex splitting and pouring South following the SSW event in early February 2018*

There is still a lot to be learnt about Sudden Stratospheric Warmings (SSWs), but volcanic activity, El Ninos, warmer sea surface temperatures, low solar activity, etc., can all lead to a weaker polar vortex, which splits, etc.[176] Winters 2017 / 2018 and 2018 / 2019 were both characterised by very low solar conditions. In early February 2018 a SSW happened, which propagated down into the troposphere and led to the renown 'Beast from the East' in North Western Europe at the end of February. Additional cold outbreaks followed in mid-March and the in general it was a cold spring with a late arrival of summer.

In the first week of 2019 another SWW even occurred, which also propagated down into the troposphere. In led to an initial cold snap in North Western and Central Europe at the end of January 2019, while the polar vortex split and poured South into Canada and Central USA. This intense cold in the USA had the consequences of firing up the jetstream across the Atlantic, flipping the NAO back to strongly positive, with the net result that the remaining part of the winter and into spring in North Western Europe was quite mild.

[174] https://www.ethz.ch/content/dam/ethz/special-interest/usys/iac/iac-dam/documents/group/chemie/Impacts%20of%20solar%20variability%20on%20climate.pdf

[175] https://arxiv.org/pdf/1602.06397.pdf

[176] Research is ongoing, but a solar link is being seen: https://www.terrapub.co.jp/onlineproceedings/ste/CAWSES2007/pdf/CAWSES_257.pdf

In is notewothy that if one reviews Samuel Pepys' diary, written in the 1660s during the period of the 'Little Ice Age', while it records as to how intense cold periods occurred with the famous 'frost fairs' on the frozen River Thames, there was also quite a number of mild winters in a row.[177] Indeed, in 1662 the winter was again very warm, "*which do threaten a plague*," and January 15th was "*a fast day ordered by Parliament to pray for more seasonable weather*". The future is yet to be written, but as we move into a period of low solar activity more reminisicent of that period, will our winter weather be characterised by more Arctic outbreaks than we have been used to? Time will of course tell, but the evidence does point that way. Indeed, as H.H. Lamb's book documents, that period was characterised by wind patterns, which were more Easterly than found in the 20th Century.

2.13 Cloud cover is also a variable

As has been documented in the previous Sections 2.4 to 2.6, the whole output of the IPCC's work is inherently flawed, as they do not understand the dynamics of the water vapour cycle and clouds in particular. Furthermore, we do know that cloud cover varies, see for example Figure 2.36 below:

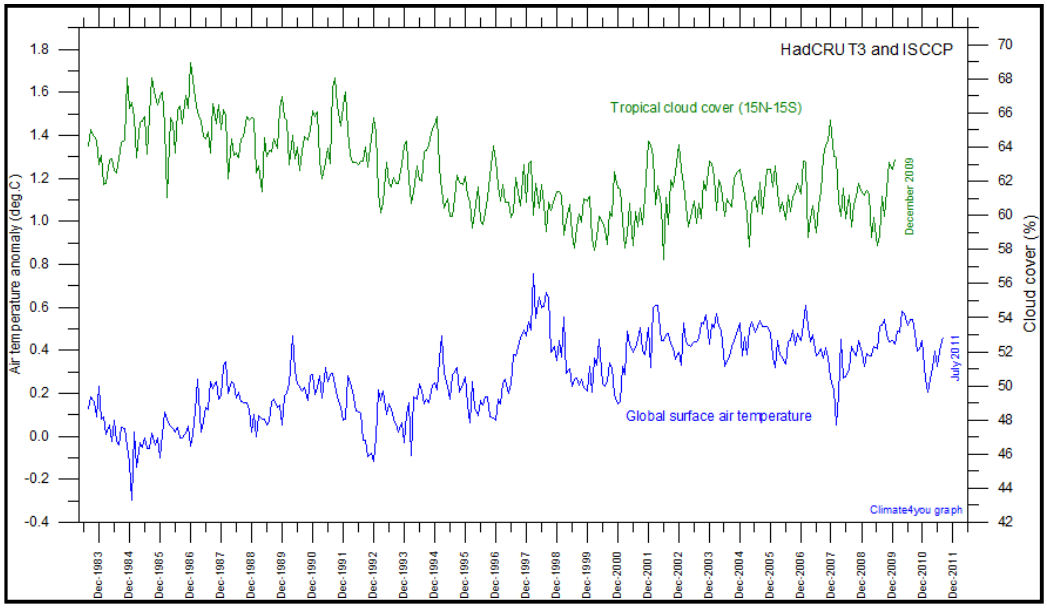


Figure 2.36: *Variation of tropical cloud cover with global surface temperatures (1983 to 2011)*[178]

Tropical cloud cover decreased in the 1980s and 1990s during the period when we saw an equivalent rise in global surface temperatures. It also provides a plausible explanation as to why there were subsequently two very significant El Nino events, as with less tropical cloud cover, the tropical oceans would have warmed more. Henrik Svensmark is a physicist and professor in the Division of Solar System Physics at the Danish National Space Institute (DTU Space) in Copenhagen. The 'Svensmark theory' postulates that during a period of a quieter sun, the increased

[177] ftp://ftp.library.noaa.gov/docs.lib/htdocs/rescue/mwr/049/mwr-049-07-0410b.pdf

[178] https://www.climate4you.com/ (Climate + Clouds)

penetration of cosmic rays into the atmosphere causes additional ionisation and subsequent nucleation for clouds to form.[179]

In simple terms, during a quieter sun, there should be an increase in cloud cover and hence less solar radiation reaching the earth's surface, therefore a cooling effect. While with a more active sun there are less cosmic rays, hence less clouds and therefore a general warming effect. It is a theory backed up by experimental work and one which is gaining acceptance. As previously, time will tell as we move into this period of a quieter sun and additional data is recorded.

2.14 Conclusions

In conclusion on this Section:

- The impact of CO_2 from burning fossil fuels on the global heat balance is minor (≈ 2%). The planet is a complex 'heat engine', for catastrophic warming to occur this would need to be highly unstable – which it isn't, as if it was we would know about it already.

- There is no dramatic change in climate occurring and present conditions are normal; i.e. in line with what one would expect from natural impacts and nothing that hasn't been seen before. The increased greening from the rise in CO_2 concentrations is a welcome benefit, particular so in arid regions.

- Climate models are incapable of replicating the complexities of this 'heat engine' and are totally unfit for making predictions.

- Many decades of careful and interesting observations will be required to improve our knowledge of the complex natural variations.

"Our government has kept us in a perpetual state of fear -- kept us in a continuous stampede of patriotic fervor -- with the cry of grave national emergency... Always there has been some terrible evil to gobble us up if we did not blindly rally behind it by furnishing the exorbitant sums demanded. Yet, in retrospect, these disasters seem never to have happened, seem never to have been quite real."
— General Douglas MacArthur 1957

[179] https://www.nature.com/articles/s41467-017-02082-2