**Article:**
Simpson, M. orcid.org/0000-0002-2555-6019 (2024) The scientific case against net zero: falsifying the greenhouse gas hypothesis. Journal of Sustainable Development, 17 (6). pp. 137-157. ISSN 1913-9063

https://doi.org/10.5539/jsd.v17n6p137

Journal of Sustainable Development; Vol. 17, No. 6; 2024
ISSN 1913-9063 E-ISSN 1913-9071
Published by Canadian Center of Science and Education

# The Scientific Case Against Net Zero: Falsifying the Greenhouse Gas Hypothesis

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Received: September 11, 2024 Accepted: November 2, 2024 Online Published: November 15, 2024

doi:10.5539/jsd.v17n6p137 URL: https://doi.org/10.5539/jsd.v17n6p137

**Abstract**

The UK Net Zero by 2050 Policy was undemocratically adopted by the UK government in 2019. Yet the science of so-called 'greenhouse gases' is well known and there is no reason to reduce emissions of carbon dioxide ($CO_2$), methane ($CH_4$), or nitrous oxide ($N_2O$) because absorption of radiation is logarithmic. Adding to or removing these naturally occurring gases from the atmosphere will make little difference to the temperature or the climate. Water vapor ($H_2O$) is claimed to be a much stronger 'greenhouse gas' than $CO_2$, $CH_4$ or $N_2O$ but cannot be regulated because it occurs naturally in vast quantities. This work explores the established science and recent developments in scientific knowledge around Net Zero with a view to making a rational recommendation for policy makers. There is little scientific evidence to support the case for Net Zero and that greenhouse gases are unlikely to contribute to a 'climate emergency' at current or any likely future higher concentrations. There is a case against the adoption of Net Zero given the enormous costs associated with implementing the policy, and the fact it is unlikely to achieve reductions in average near surface global air temperature, regardless of whether Net Zero is fully implemented and adopted worldwide. Therefore, Net Zero does not pass the cost-benefit test. The recommended policy is to abandon Net Zero and do nothing about so-called 'greenhouse gases'.

**Keywords:** net zero, greenhouse gases, near surface atmospheric temperatures

## 1. Introduction

In the UK the Net Zero policy (meaning net zero emission of carbon dioxide, $CO_2$) has been undemocratically imposed on the UK population in the name of saving the planet from an imaginary 'climate emergency'. The fight back by UK citizens has begun (Not a lot of people know that, 2019) because of the enormous cost associated with decarbonizing the energy system (circa £3trillion or more) and the significant changes proposed to the way we live (i.e. Electric vehicles - banning the sale of new petrol and diesel vehicles, including hybrids; banning installation of new gas boilers for central heating - forcing consumers to invest in heat pumps) (Hughes, 2024; Montford, 2022; Montford 2024a; Montford 2024b; NESO; 2024. Travers, 2020). In Switzerland the electorate rejected further strengthening of the CO2 Act (Switzerland, 2021).

The Net Zero agenda in the UK was adopted based on the Climate Change Act (2008) and sets legally binding targets to reduce carbon dioxide ($CO_2$) emissions in the UK by at least 80% by 2050, from 1990 levels. The law requires that other greenhouse gases are also reduced and that climate change risks are adapted to. The Act (2008) requires the Government to set five-year emissions reductions targets, known as 'carbon budgets'. In 2019, the Climate Change Act 2008 (2050 Target Amendment) Order 2019 was passed which increased the UK's commitment to a 100% reduction in emissions by 2050. A further amendment in 2022 incentivized the transition away from fossil fuels with subsidies of so-called 'clean energy' for businesses. This is the UK Net Zero project.

The economic consequences of pursuing Net Zero are thought to be devastating for the UK with estimates of costs up to £1.4 trillion for the UK alone offset by £1.1 trillion potential but dubious savings giving a net cost of £321 billion (385.2bn USD) or a cost of £10bn a year rising to £50bn a year according to the UK Climate Change Committee (https://www.theccc.org.uk/publications/). Recent reports (NESO, 2024) clearly show that Net Zero does not pass the cost-benefit test (Montford, 2024b) and is likely to cost each household in the UK £78,000 to decarbonise power generation and £58,000 to decarbonise road transport between now and 2050. With investment costs alone of £40bn per annum to 2050. All this expenditure, ~£300,000 per household in total, will be paid for by taxpayers, consumers, and businesses or through national debt for future generations to pay for (Sasse, 2021).

This will hurt the poorest and most vulnerable in society the most, increasing household bills by several thousand pounds a year.

The UK is a few very small islands (total area: 241,930 km2; with less than 1% of the world's population at ~70m) and emits about 1% (0.327 Peta grams or 0.043% of all $CO_2$ sources equivalent to approximately 0.042ppmv) which is negligible. Noting that half of all $CO_2$ emitted to the air per annum is lost to the ocean and biomass.

With such wide-ranging policies and enormous costs for pursuing an all-electric approach, eliminating fossil fuels, excessive investment in and subsidy of unreliable, intermittent, and variable output from renewables and Net Zero by 2050 one would have thought the science would be overwhelming and readily available in the public domain. The 'science' has never been discussed by UK politicians to our knowledge, but one would have thought this would be essential before embarking on such a high-cost project as Net Zero.

*1.1 Background to the Climate Scare*

The argument for Net Zero is that the concentration of $CO_2$ in air is increasing, some small portion of which may be due to human activities and that Net Zero will address this supposed 'problem'. The underpinning consensus hypothesis is that the human emission of so-called 'greenhouse gases' will increase concentrations of these gases in the atmosphere and thereby increase the global near surface atmospheric temperature by absorbance of infrared radiation leading to catastrophic changes in the weather. This leads to the idea that global temperatures should be limited to 2°C and preferably 1.5°C to avoid catastrophic climate change (Paris Climate Agreement, 2015). A further hypothesis is that there are tipping points in the climate system which will result in positive feedback and a runaway heating of the planet's atmosphere may occur (Schellnhuber & Turner, 2009; Washington et al., 2009; Levermann et al., 2009; Notz & Schellnhuber, 2009; Lenton et al., 2008; Dakos et al., 2009; Archer et al., 2009). Some of these tipping point assumptions are built into faulty climate models, the outputs of which are interpreted as facts or evidence by activists and politicians. However, output from computer models is not data, evidence or fact and is controversial (Jaworowski, 2007; Bastardi, 2018; Innis, 2008: p.30; Smith, 2021; Nieboer, 2021; Craig, 2021). Only empirical scientifically established facts should be considered so that cause and effect are clear.

From the point of view of physics, the atmosphere is an almost perfect example of a stable system (Coe, et al., 2021). The climate operates with negative feedback (Le Chatelier's Principle) as do most natural systems with many degrees of freedom (Kärner, 2007; Lindzen et al., 2001 & 2022). The ocean acts as a heat sink, effectively controlling the air temperature. Recent global average surface temperatures remain relatively stable (Easterbrook, 2016; Moran, 2015; Morano, 2021; Marohasy, 2017; Ridley, 2010) or warming very slightly from other causes (Sangster, 2018) and the increase in temperature from 1880 through 2000 is statistically indistinguishable from 0°K (Frank, 2010; Statistics Norway, 2023) and is less than predicted by climate models (Fyfe, 2013). This shows the difference between the consensus view and established facts.

There are a variety of problems in this area such as poor quality data (Marohasy, 2017; Booker, 2009; Plimer 2009; Plimer, 2017; Plimer, 2021; Wallace et al., 2017), unjustified data adjustments, infilling missing data to make the data fit the theory (Connolly et al., 2021; Nieboer, 2021) and homogenization of known poor quality weather station data with good quality data all of which are unknown in science. Tampering with data is fraudulent and the known bad data should have been excluded but this is apparently routinely used in climatology and raises questions about the consensus view (Marohasy, 2017; Marohasy 2020; O'Neill, et al., 2022; Wallace et al., 2017). Some 96% of US weather stations were found to be incorrectly or poorly sited (e.g. near artificial sources of heat such as air conditioning outlets, on concrete pads, close to buildings or car parks, in urban heat islands etc.) leading to artificial increases in measured temperatures in the USA (Watts, 2009; Watts, 2022; Fall et al., 2011). Loss of Russian weather stations from the data set (Booker, 2009; Drake, 2010), instrument changes, re-location of weather stations, population growth and land-use changes artificially increased calculated global average temperatures. These are basic mistakes in data collection, data handling, data analysis and are misleading.

There has been no increase in floods, droughts, hurricanes, strength of hurricanes or forest fires (Pielke, 2014; Curry, 2019; Watts & Taylor, 2022), no increase in extreme weather events (Alimonti et al., 2022; Alimonti & Mariani, 2024), a negative relationship between vulnerability and wealth (Formetta & Feyen, 2019) and all in agreement with the Intergovernmental Panel on Climate Change (IPCC) views on the science which leads to questions about how the climate may be changing (Field et al., 2012; Pachauri, 2007 & 2014; Solomon et al., 2007; Stocker et al., 2013).

The IPCC has produced six major assessment reports (AR1 to 6) and several special reports which report on a great deal of good science (Noting that the IPCC does not do any science itself but merely compiles literature reviews). The Summaries for Policy Makers (SPM) are followed by most politicians. Yet the SPM do not agree in large part with the scientific assessment by the IPCC reports and appear to exaggerate the role of $CO_2$ and other

'greenhouse gases' in climate change. It appears that the SPM is written by governments and activists *before* the scientific assessment is reached which is a questionable practice (Ball 2011, 2014 and 2016; Smith 2021).

Other organizations have produced reports of a similar nature and using a similar literature (e.g. Science and Public Policy Institute; The Heartland Institute; The Centre for the Study of CO2; CO2 Science; Global Warming Policy Foundation; Net Zero Watch; The Fraser Institute; CO2 Coalition) and arrived at completely different conclusions to the IPCC and the SPM (Idso et al., 2013a; Idso et al., 2013b; Idso et al., 2014; Idso et al., 2015a, 2015b; Happer, et al., 2022). There are also some web pages (e.g. Popular Technology) which list over a thousand mainstream journal papers casting doubt on the role of $CO_2$ and other greenhouse gases as a source of climate change. For example, a recent report by the CO2 Coalition (2023) states clearly Net Zero regulations and actions are scientifically invalid because they:

- "*Fabricate data or omit data that contradict their conclusions.*
- *Rely on computer models that do not work.*
- *Rely on findings of the Intergovernmental Panel on Climate Change (IPCC) that are government opinions, not science.*
- *Omit the extraordinary social benefits of $CO_2$ and fossil fuels.*
- *Omit the disastrous consequences of reducing fossil fuels and $CO_2$ emissions to Net Zero.*
- *Reject the science that demonstrates there is no risk of catastrophic global warming caused by fossil fuels and $CO_2$.*

*Net Zero, then, violates the tenets of the scientific method that for more than 300 years has underpinned the advancement of western civilization*." (CO2 Coalition, 2023; p. 1)

With such a strong scientific conviction the entire Net Zero agenda needs investigating. This paper reviews some of the important science which supports and undermines the Net Zero agenda.

## 2. Material Studied

A literature review was carried out on various topics related to greenhouse gases, climate change and the relevant scientific literature from the last 20 years in the areas of physics, chemistry, biology, paleoclimatology, geology etc. The method used was an evidence-based approach where several issues were critically evaluated based on fundamental knowledge of the science, emerging areas of scientific investigation and developments in scientific methods. The evidence-based approach is widely used (Green & Britten, 1998; Odom et al., 2005; Easterbrook, 2016; Pielke, 2014; IPCC, 2007a; IPCC 2007b; Field, 2012; IPCC 2014; McMillan & Shumacher, 2013). Evidence-based research uses data to establish cause and effect relationships which are known to work and allows interventions which are therefore expected to be effective.

Double checking of facts was a major undertaking. The readability and accessibility for the non-scientist was also thought to be important and so well referenced books, literature reviews and official reports summarizing the current knowledge in the area were used (Watts et al., 2022; Nieboer, 2021; Koonin, 2021, Moran, 2015; Morano, 2021; Wrightstone, 2017 and 2023; Marohasy 2017; Marohasy, 2020; Booker, 2009; Plimer, 2009; Plimer, 2017; Plimer, 2021; Ball, 2014; Ball, 2011; Ball, 2016; Carter, 2010).

The scientific method is based on the idea that testable hypotheses can be put forward, tested against data and observation, and falsified (Popper, 1935). This is normal practice in the physical sciences (Chalmers, 1982, 2002, 2013). Noting that it only takes one sound piece of research to falsify a theory (i.e. prove it wrong). For example, it is now common practice for research papers to state that it is essential to reduce $CO_2$ emissions or greenhouse gas emissions without citing any supporting scientific literature or evidence. To a scientist this is unacceptable and should be challenged. This approach and the obsession with politically driven targets such as keeping global warming to 2°C or 1.5°C impose artificial constraints on scientists and policy makers and drown out rational debate and use of evidence to the contrary.

## 3. Greenhouse Gas Theory

The historical development of the greenhouse effect, early discussions and controversies are presented by Mudge (2012) and Strangeways (2011). The explanation of the greenhouse effect or greenhouse gas theory of climate change is given in the IPCC Fourth Assessment Report Working Group 1, The Physical Science Basis (IPCC, 2007, p. 946):

> "*Greenhouse gases effectively absorb thermal infrared radiation emitted by the Earth's surface, by the atmosphere itself due to some gases, and by clouds. Atmospheric radiation is emitted to all sides,*

> *including downward to the Earth's surface. Thus, greenhouse gases trap heat within the surface-troposphere system. This is called the greenhouse effect*."

This is plausible but does not necessarily lead to global warming as radiation will be emitted at longer wavelengths in other areas of the electromagnetic spectrum where greenhouse gases do not absorb radiation potentially leading to an energy balance without increase in temperature. To further complicate matters the definition continues with the explanation:

> "*Thermal infrared radiation in the troposphere is strongly coupled to the temperature of the atmosphere at the altitude at which it is emitted. In the troposphere, the temperature generally decreases with height. Effectively, infrared radiation emitted to space originates from an altitude with a temperature of, on average, -19°C in balance with the net incoming solar radiation, whereas the Earth's surface is kept at a much higher temperature of, on average, +14°C. An increase in the concentration of greenhouse gases leads to an increased infrared opacity of the atmosphere, and therefore to an effective radiation into space from a higher altitude at a lower temperature. This causes a radiative forcing that leads to an enhancement of the greenhouse effect, the so-called enhanced greenhouse effect*."

This sort of statement is not comprehensible to the average person, makes no sense scientifically and is immediately falsified by recent research (Seim and Olsen, 2020; Coe etal., 2021; Lange et al., 2022, Wijngaarden & Happer, 2019, 2020, 2021(a), 2021(b), 2022, Sheahen, 2021; Gerlich & Tscheuschner, 2009; Zhong & Haigh, 2013). It also contradicts the work of Gray (2015 and 2019) and others and has been heavily criticized (Plimer, 2009; Plimer, 2017; Carter, 2010).

### *3.1 The Falsifications of the Greenhouse Effect*

There are numerous falsifications of the greenhouse gas theory (sometimes called 'trace gas heating theory', see Siddons in Ball, 2011, p.19), of global warming and/or climate change (Ball, 2011; Ball, 2014; Ball, 2016; Gerlich & Tscheuschner, 2009; Hertzberg et al, 2017; Allmendinger, 2017; Blaauw, 2017; Nikolov and Zeller, 2017). Fundamental empirically derived physical laws place limits on any changes in the atmospheric temperature unless there is some strong external force (e.g. increased or decreased solar radiation). For example, the Ideal Gas Law, the Beer-Lambert Law, heat capacities, heat conduction etc., (Atkins & de Paula, 2014; Barrow, 1973; Daniels & Alberty, 1966) all place physical limits on the amount of warming or cooling one might see in the climate system given any changes to heat from the sun or other sources.

#### 3.1.1 The Ideal Gas Law

$$PV = nRT \tag{1}$$

This law was obtained from experimental work on gases and is well established (Atkins & de Paula, 2014). Further work gave the Molar Mass Ideal Gas Law (Robert, 2018; Holmes, 2017, 2018 and 2019) as:

$$T = PM/pR \tag{2}$$

Where:

T = average near-surface atmospheric temperature in Kelvin

P = average near-surface atmospheric pressure in kPa (kilo Pascal)

n = is the number of moles of a real gas

M = average near-surface atmospheric mean molecular weight

R = gas constant (m3 K-1 mole-1 kg) = 8.314

V = volume in m3

p (rho) = Average near-surface atmospheric density in kg m-3

Table 1. Comparison of calculated and actual *in situ* measured temperatures for planetary bodies

| Planetary Body | Pressure (kPa) | Molar Mass at surface, M (gm mol-1) | Density at surface, p (kg/m3) | Calculated Temperature (Kelvin) | Actual Measured Temperature (Kelvin) | Error (%) |
|---|---|---|---|---|---|---|
| Venus | 9200 | 43.45 (1) | 65 | 739.7 | 740 | 0.04% |
| Earth | 101.3 | 28.97 | 1.225 | 288.14 | 288 | 0.05% |
| South Pole of Earth | 68.13 | 28.97 | 1.06 | 224 | 224.5 | 0.20% |
| Titan | 146.7 | 28.00 (2) | 5.25 | 93.6 | 94 | 0.42% |
| Mars (low pressure) (5) | 0.69 – 0.9 | 43.34 | 0.02 | 180 to 234 (207 average) | 210 | 1.40% |
| Jupiter (3) | 101.3 | 2.2 | 0.16 | 167 | 165 | 1.20% |
| Saturn | 101.3 | 0.19 | 2.07 | 132.8 | 134 | 0.89% |
| Uranus | 101.3 | 2.64 | 0.420 | 76.6 | 76 | 0.79% |
| Neptune | 101.3 | 2.53 -2.69 (4) | 0.450 | 68.5 to 72.8 | 72 | 0.00% |

**Sources:** adapted from Robert, HI (2018); R = gas constant ($m^3 K^{-1} mole^{-1} kg$) = 8.314. For Jupiter, Saturn, Uranus and Neptune the pressure chosen (101.3 kPa) is high in the atmosphere. These gas giants do not have a defined surface. See Nasa and wikipedia entries for these planetary bodies. **Notes**: (1) Venus: 96.5% supercritical carbon dioxide, 3.5% Nitrogen, with 150ppmv Sulphur dioxide. (2) Titan: 95% Nitrogen, 5% methane. (3) Jupiter is mostly Hydrogen, temperature calculated at 1 atmosphere (101.3kPa). (4) Neptune: NASA give two values for mean molar mass, 2.53 and 2.69$gmol^{-1}$. (5) Mars, the method is inaccurate due to the very low and variable atmospheric pressure. Pressures were measured at the Viking 1 landing site and varied between 690Pa (0.68% of the Earth's atmospheric pressure) and 900Pa (0.89% of the Earth's atmospheric pressure) according to the season. Only in atmospheres of over 10kPa is strong convection and troposphere/tropopause and the associated thermal gradient formed (see Lapse rate) (Holmes, 2018).

The Ideal Gas Law can be used to make predictions of the near surface atmospheric temperature on planetary bodies with an atmospheric pressure greater than 10kPa given a few variables which are known for that planetary body. This approach debunks the commonly held view that Venus has a high temperature due to the greenhouse effect which is due to the very high concentration of $CO_2$ in the atmosphere (96.5% $CO_2$, 3.5% nitrogen with trace amounts of carbon monoxide, sulfur dioxide, argon, and helium). The Ideal Gas Law predicts a high atmospheric temperature for Venus simply because the atmospheric pressure is so great (90 times that of Earth).

The average near-surface temperature for planetary bodies with an atmosphere calculated from the Ideal Gas Law is in excellent agreement with measured values suggesting that the greenhouse effect is very small or non-existent (Table 1). It is thought that the residual temperature difference of 33K between the Stephan-Boltzmann black body effective temperature (255K) on Earth and the measured near-surface temperature (288K) is caused by adiabatic auto-compression (Allmendinger, 2017; Robert, 2018; Holmes 2017, 2018 and 2019). An alternative view of this is given by Lindzen (2022). There is no need for the 'greenhouse effect' to explain the near surface atmospheric temperature of planetary bodies with atmospheric pressures above 10kPa (Holmes, 2017). The ideal gas law is robust and works for all gases.

3.1.2 Measurement of Infrared Absorption of the Earth's Atmosphere

It is now possible to calculate the effect of 'greenhouse gases' on the surface atmospheric temperature by (a) using laboratory experimental methods; (b) using the Hitran database (https://hitran.org/); (c) using satellite observations of outgoing radiation compared to Stephan-Boltzmann effective black body radiation and calculated values of temperature.

Seim and Olsen, (2020) performed laboratory experiments to try and determine the effect of $CO_2$ concentrations on surface air temperatures and found only a very slight effect from back-scattered radiation. Coe, et al., (2021) used the Hitran database to calculate the fraction of the earth's radiated energy absorbed and radiated into space by differing concentrations of $CO_2$, $H_2O$, $CH_4$ and $N_2O$ (i.e. the most abundant and supposedly most powerful

'greenhouse gases'). The near surface temperature and change in surface temperature can be calculated. The result is that climate sensitivity to doubling concentration of $CO_2$ is (0.5°C) including 0.06°C from $CH_4$ and 0.08°C from $N_2O$ which is so small as to be undetectable. Most of the temperature change has already occurred and increasing $CO_2$, $CH_4$, $N_2O$ concentrations will not lead to significant changes in air temperatures because absorption is logarithmic (Beer-Lambert Law of attenuation) – a law of diminishing returns.

The IPCC reports radiative Forcing (Watts per square meter) as:

$$\text{Forcing (F)} = 5.35\text{Ln}(C_t/C_0) \quad (3)$$

and that temperature change is:

$$\text{Delta(t)} = \text{Lamdba x Delta(F)} \quad (4)$$

Where Lamda is thought to be 0.4 to 0.5; $C_t$ is the concentration (ppmv) and $C_0$ is the starting concentration (ppmv).

This gives Figure 1, which shows that between 400ppmv and 800ppmv of $CO_2$ the cumulative expected temperature change is ~1.49°C (Lamda = 0.4) and ~1.85°C (Lamda = 0.5) which is small and certainly not cause for alarm or for declaring a 'climate emergency'. However, there are many other variables which affect temperatures, the ocean is a huge heat sink which moderates the global air temperature and absorbs $CO_2$ (Henry's Law). Cloud cover can have significant effects on air temperatures and provide negative feedback in the climate system.

Wijngaarden & Happer (2020 and 2021) and Schildknecht, (2020) have done a similar analysis to that of Coe et al., (2021) using the Hitran database but then compared their calculations with satellite observations of outgoing radiation and obtained a near perfect match (Sheahen, 2021). This point is important as the scientific method requires agreement between observations (the satellite measurements of outgoing radiation across a wide range of frequencies) and calculated values from theoretical constructs such as absorption (Beer-Lambert Law) and emission (Stephan-Boltzmann equation) across the same range of frequencies. Wijngaarden & Happer (2020 and 2021) experimented by calculating doubling $CO_2$ concentrations and found only a very small increase in temperature due to the near saturation of the $CO_2$ absorption bands. This means that adding more $CO_2$ to the atmosphere in both theoretical and practical terms will make negligible difference to the global average surface temperature. This is in line with other scientists' assessments (Table 2).

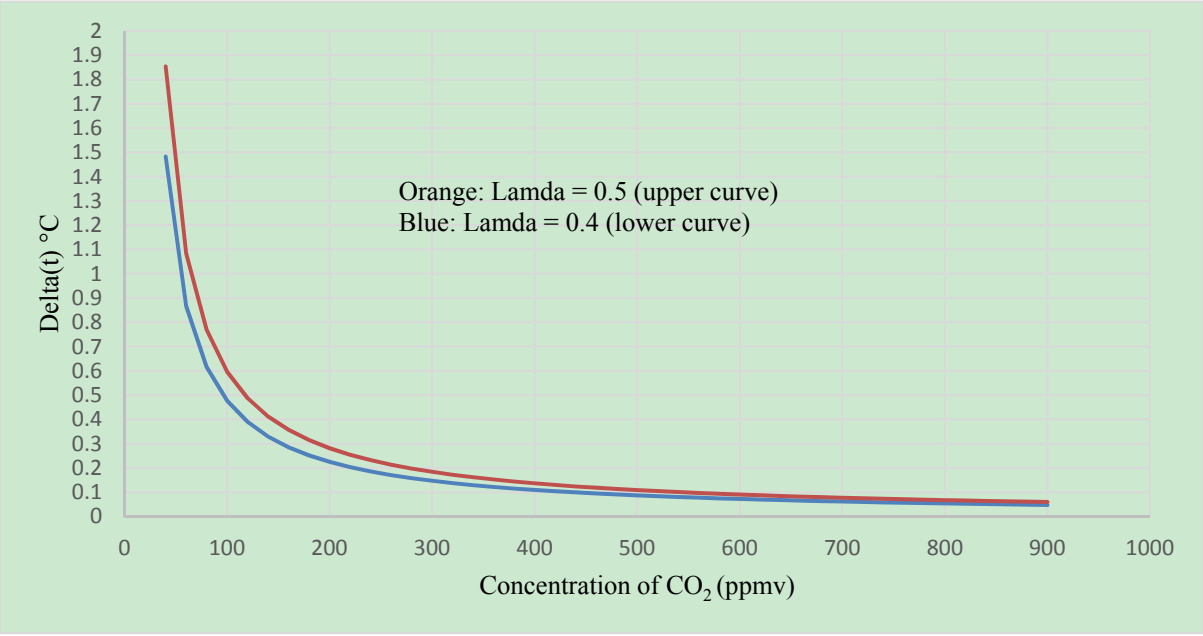


Figure 1. Delta T vs $CO_2$ concentration

The important point here is that the Ideal Gas Law, the logarithmic absorption of radiation and the theoretical calculations by Wijngaarden & Happer (2020 and 2021), Coe et al., (2021) based on the Beer-Lambert Law and the Stephan-Boltzmann Law show that there is an upper limit to the temperature change which can occur by adding 'greenhouse gases' to the atmosphere if the main source of incoming radiation (the Sun) does not change over time. The upper limit is ~1.85°C.

Recent reports show that achieving Net Zero (emissions of greenhouse gases) will have a negligible effect on temperature ~0.28°C from heat transfer calculations (Lindzen & Happer, 2024; Lindzen, et al., 2024).

Table 2. Evaluating the greenhouse effect on atmospheric temperatures

| Greenhouse Effect on Temperatures (Comments) | Authors/Sources |
|---|---|
| 1.5 to 6°C on doubling concentration of $CO_2$ in air. | IPCC reports |
| Negligible/no effect. The varying solar irradiation constitutes the sole input driving the changes in the system's energy transfers. | Blaauw (2017); Soon (2007); Soon et al., (2015) |
| Negligible, accounted for in the Ideal Gas Law. Measured near-surface temperature is caused by adiabatic auto-compression. No single gas has an anomalous effect on atmospheric temperatures. Net Zero will have trivial effect on reducing temperature. | Robert (2018); Holmes (2017); Holmes (2018), Holmes (2019); Atkins & de Paula (2014); Salby (2012); Lindzen and Happer, 2024; Lindzen, et al., 2024. |
| Calculated effect of gases on the 255K Stephan-Boltzmann effective temperature: water vapor (29.4K), $CO_2$ (3.3K), $CH_4$ and $N_2O$ (0.3K). Climate sensitivity to further increases in $CO_2$ are (0.5K) including 0.06K from $CH_4$ and 0.08 from $N_2O$ which is undetectable. Most heating has already occurred and increasing $CO_2$, $CH_4$, $N_2O$ will not lead to significant changes in earth temperatures. Feedback is minor and the earth's atmosphere is a near perfect example of a stable system. | Coe et al, (2021) |
| The increase in the Total Solar Insolation over 100 years contributes to a warming of 0.44°C (60%) and the 100ppmv increase of $CO_2$ over this period causes additional 0.30°C (40%) in excellent agreement with the measured warming and cloud cover. $CO_2$ climate sensitivity larger than 1°C is improbable, a value of 0.6 to 0.8°C, depending on the considered solar anomaly, fits well with all observations of a changing solar constant, the cloud cover, and global temperature. Feedback is negative and stabilizing. A relatively weak ($r^2$ = 0.30), but positive correlation between atmospheric $CO_2$ concentration and temperature, in which a doubling of $CO_2$ is accompanied by a ~0.6 °C increase in temperature, although this is not cause and effect (Kuo et al., 1990). An Equilibrium Climate Sensitivity on doubling $CO_2$ concentrations in air is 0.5°C to 0.6°C and the effect on earth's climate is negligible, any feedback is negative. Published papers between 2000 and 2018 show a systematic tendency towards ΔT ~0.5°C with increasing publication date (Schildknecht, 2020) | Harde (2014, 2017a; 2017b, 2019); Shaviv & Veizer (2003); Nordt et al., (2003); Kuo et al., (1990); Schildknecht, (2020) |
| Small effect, calculation of the outgoing radiation is in complete agreement with satellite measurements. Increases in $CO_2$ etc., will make little difference to the climate. Methane has no effect on earth's temperature (Sheahen, 2021; Flemming, 2020). Experimental evidence "questions the fundament of the forcing laws used by the IPCC" (Seim & Olsen, 2020). "The net forcing from $CH_4$ and $CO_2$ increases is about 0.05 $Wm^{-2}$ $year^{-1}$. Other things being equal, this will cause a temperature increase of about 0.012 C $year^{-1}$." The main greenhouse gases, $CO_2$, $CH_4$ and $N_2O$ have contributed about 0.1 °C/decade of the warming observed over the past few decades, this would correspond to about 0.00064 K per year or 0.064 K per century of warming from $N_2O$. Proposals to place harsh restrictions on $CO_2$, $CH_4$ and $N_2O$ emissions because of warming fears are not justified by these facts. Restrictions would cause serious harm, for example by jeopardizing world food supplies. | Wijngaarden & Happer, (2021); Wijngaarden & Happer (2020); Sheahen (2021); Fleming (2020); Seim & Olsen, (2020); Wijngaarden & Happer, (2019). |
| Negligible/small, lost within the measuring inaccuracy and uncertainties. The empirically derived conventional heat conduction equation is sufficient. | Gerlich & Tscheuschner (2009) |
| Negligible, the greenhouse effect is minor; back radiation from water vapor is 200 times that of $CO_2$ | Lightfoot & Mamer (2017) |
| Negligible/no effect, cause and effect are confused. | Nikolov & Zeller (2017) |
| Negligible/no effect. Photometric or spectroscopic infrared measurements cannot explain the behavior of atmospheric gases. At least 20 crucial errors are revealed in | Allmendinger (2017) |

| | |
|---|---|
| the greenhouse gas theory suggesting it should be abandoned. | |
| No such thing as the greenhouse effect, competing forces of evaporation, convection, precipitation, and radiation create an energy balance in the atmosphere. | Plimer (2009) |
| No effect. Every record of any duration for any period in the history of the Earth the temperature increase precedes $CO_2$ increase. Therefore, changes in $CO_2$, $CH_4$, $N_2O$ etc., will not affect atmospheric temperatures. | Ball (2014); Hodzic & Kennedy, (2019) |
| There is no experimental evidence for a significant anthropogenic component to climate change. | Kaupinnen & Malmi (2019) |
| Much of the global warming since the mid-20th century and earlier could be explained in terms of solar variability | Connolly et al., (2021) |
| Anthropogenic fossil derived $CO_2$ in air in 2018 is ~46.84 ppmv (very small), the rest 363ppmv is natural. Anthropogenic effects are very low compared to natural changes. Harde (2019) suggests 17ppmv is the total human contribution to $CO_2$ concentrations. | Skrable et al., (2022); Berry (2019 & 2020), Berry (2021); Harde (2019) |

3.1.3 Other Falsifications

Following a careful analysis of the so-called 'greenhouse effect' and the IPCC's attribution of 80% of warming to water vapor (~5% in air) and 20% to $CO_2$ (~0.04% in air) it was concluded that:

> *"If such an extreme effect existed, it would show up even in a laboratory experiment involving concentrated $CO_2$ as a thermal conductivity anomaly. It would manifest itself as a new kind of 'superinsulation' violating the conventional heat conduction equation*." (Gerlich & Tscheuschner, 2009, p.280).

The application of the fundamental principles of physics (i.e. thermal conductivity and isochoric thermal diffusivity (which measures the ability of a material to conduct thermal energy relative to its ability to store thermal energy; high values means heat transfers quickly) and thermodynamics in a rigorous way clearly demonstrates that doubling $CO_2$ concentrations leads to negligible changes in thermal conductivity, isochoric thermal diffusivity, and heat capacity of air and as such these changes will be lost within the measuring inaccuracy and uncertainties and can hardly affect the physical properties of the atmosphere. For example, it was concluded that the effect of back radiation from water vapor is 200 times that of $CO_2$ (Lightfoot & Mamer, 2017):

> *"Thus, if $CO_2$ has any effect on atmospheric temperature and climate change, we show it is negligible." [p. 661]* and *"The sun controls the water vapor concentration in the atmosphere and it in turn controls the back radiation and atmospheric temperature and, hence, the climate. The effects of back radiation on Earth's atmospheric temperature is up to 200 times larger than that of $CO_2$ and works opposite to it. It overrides the effect of $CO_2$ such that the $CO_2$ contribution to atmospheric temperature is so small as to be negligible."* (Lightfoot & Mamer, 2017: p. 670)

This view is supported (Nikolov and Zeller, 2017) concluding that:

> *"…the so-called 'greenhouse back radiation' is globally the result of the atmospheric thermal effect* [adiabatic auto-compression] *rather than a cause for it."* (Nikolov & Zeller, 2017: p. 1).

The greenhouse gas theory has been refuted finding:

> *"The cardinal error in the usual greenhouse theory consists in the (false) assumption that photometric or spectroscopic IR-measurements allow conclusions about the thermal behavior of gases, i.e. the atmosphere. …Apart from this, at least twenty crucial errors are revealed which support abandoning the* [greenhouse gas] *theory as a whole."* (Allmendinger, 2017: p.1).

Using a simple model of the atmosphere Blaauw (2017):

> *"…demonstrates that global warming can be explained without recourse to the greenhouse* [gas] *theory. …The varying solar irradiation constitutes the sole input driving the changes in the system's energy transfers… the model reproduces the global warming calculated trend in the surface temperature* [and] *agrees well with the observational data from AD1750 to AD 2000."* (p.468).

Benestad (2017) suggests the falsification by Gerlich & Tscheuschner (2009) has been refuted by Halpern et al., (2010) and Smith (2008) but fails to mention the robust rebuttal of the supposed refutation by Gerlich & Tscheuschner (2010) which added greater detail and criticism of the misconceptions inherent in the greenhouse

gas theory thus rendering it false.

Many climatologists ignore the well-established ideas of the Ideal Gas Law, Kinetic Theory of Gases and Collision Theory which explain the interaction of gases in the atmosphere (Atkins & de Paula, 2014; Salby, 2012; Tec science). For example, it is difficult for $CO_2$ to retain heat energy (by vibration, rotation, and translation) as there are $10^{34}$ collisions between air molecules per second per cubic meter of gas at a pressure of 1 atmosphere (~101.3kPa) and on each collision, energy is exchanged leading to a Maxwell-Boltzmann distribution (similar to a normal distribution) of molecular energies across all molecules in air (Tec science). The Maxwell-Boltzmann distribution has been experimentally determined (Atkins & de Paula, 2014). Thus, the major components of air (nitrogen and oxygen) retain most of the energy, cause evaporation of water vapor by heat transfer (mainly by conduction and convection) and emit radiation at longer wavelengths. The small concentration of $CO_2$ in air (circa 420ppmv) cannot account for large changes in the climate system which have occurred in the past (Wrightstone, 2017 and 2023; Ball, 2014). Plimer (2009 and 2017) presents a great deal of geological scientific evidence which covers paleoclimatology concluding that:

> *"There is no such thing as the greenhouse effect. The atmosphere behaves neither as a greenhouse nor as an insulating blanket preventing heat escaping from the Earth. Competing forces of evaporation, convection, precipitation, and radiation create an energy balance in the atmosphere*." (Plimer 2009: p.364).

Ball (2014) summarizes a great deal of the geological science:

> *"The most fundamental assumption in the theory that human $CO_2$ is causing global warming and climate change is that an increase in $CO_2$ will cause an increase in temperature. The problem is that every record of any duration for any period in the history of the Earth exactly the opposite relationship occurs temperature increase precedes $CO_2$ increase. Despite that a massive deception has developed and continues."* Ball (2014: p. 1).

This statement agrees with many other scientists working in geology, earth sciences, physics and physical chemistry as can be seen in cited references in books (Easterbrook, 2016; Wrightstone 2017 and 2023; Plimer, 2009; Plimer 2017; Ball, 2014; Ball,2011; Ball, 2016; Carter, 2010; Koutsoyiannis et al, 2023 & 2024; Hodzic, and Kennedy, 2019). Easterbrook (2016) uses the evidence-based approach to climate science and concludes that:

> *"Because of the absence of any physical evidence that $CO_2$ causes global warming, the main argument for $CO_2$ as the cause of warming rests largely on computer modelling*." Easterbrook (2016: p.5).

This agrees with Soon (2007):

> "*There is no quantitative evidence that varying levels of minor greenhouse gases like $CO_2$ and $CH_4$ have accounted for even as much as half the reconstructed glacial-interglacial temperature changes or, more importantly, for the large variation in global ice volumes on both land and sea over the past 650kyr*."

and leads to the conclusion that building models with the fictitious greenhouse gas effect already built into the model will give an output which clearly follows the input. Thus, if the $CO_2$ concentration is increased in the model, then the model will reflect an output of increased temperature (or some other pre-programmed climate feature) simply because the greenhouse gas effect has been built into the model (Lindzen, 1997; Rodhe et al., 2000; Idso et al., 2015b). This is circular reasoning (i.e. a logical fallacy) which is of no scientific value and is useless for making public policy on climate change or the economy or controlling $CO_2$ emissions.

> "*The degree of uncertainty in both climate forcings, and models of future climatic response leaves us in the unsatisfactory situation that all climate predictions are to some degree conditional. This circumstance will be improved if, and only if, the forcings are determined more accurately and the models are more completely validated against observations*." Rodhe et al., 2000 p. 422.

The results of the models are projected far into the future (circa 80 to 100years) where uncertainties are large, but projections can be used to demonstrate unrealistic but scary scenarios (Idso et al., 2015b). The literature that is used for the IPCC reports appears to be 'cherry picked' to agree with their paradigms that increasing $CO_2$ concentrations leads to warming. They ignore the vast literature in climatology, atmospheric physics, solar physics, physics, physical chemistry, geology, biology and palaeoclimatology much of which contradicts the IPCC's assessment in the summary for policymakers (SPM).

The objective of the IPCC was to find the human causes of climate change – not to look at all the causes of climate

change which would be the sensible thing to do if the science were to be used to inform policy decisions. However, there is no experimental evidence for a significant anthropogenic component to climate change (Kaupinnen and Malmi, 2019) which leaves genuine scientists and citizens concerned about the role of the IPCC. This approach can be summarized (Field, 2019):

> *"We have a body* [the IPCC] *that is perceived to be the peak scientific body, using non-peer reviewed literature, written in some cases by undergraduates and people who do not yet have the kinds of credentials that the IPCC would have us believe. Some of whom have vested interests and preconceived notions about what should and should not be said or what their opinions should or should not be. Which is then second-guessed by policy makers, politicians and bureaucrats who probably have not much better understanding about the science than you or I. Then that becomes the most authoritative document, the 'Bible' if you will* [on climate change]." Topher Field in discussion with investigative journalist Donna Laframboise, for the 50 to 1 project (www.50to1.net) (Field, 2019).

3.1.4 Anthropogenic $CO_2$ and the Residence time of Carbon Dioxide in Air

There is a suggestion (IPCC) that the residence time of $CO_2$ in the atmosphere is different for anthropogenic $CO_2$ and naturally occurring $CO_2$. This breaks a fundamental scientific principle, the Principle of Equivalence. That is: if there is equivalence between two things, they have the same use, function, size, or value (Collins English Dictionary, online). Thus, $CO_2$ is $CO_2$ no matter where it comes from, and each molecule will behave physically and react chemically in the same way.

The Keeling Curve of carbon dioxide concentration at Mauna Loa (https://scripps.ucsd.edu/programs/keelingcurve/) shows a very gentle increase of ~120ppmv over the last ~60 years with a smaller seasonal cycle superimposed. The smaller seasonal cycle is thought to be caused by the difference between the northern hemisphere and southern hemisphere land mass sizes, with the boreal forest of the north and Taiga acting as a very large $CO_2$ sink. This curve does not correlate with global average surface temperature which has fluctuated in the same period (Easterbrook, 2016; Wrightstone, 2017 and 2023). To a scientist familiar with the properties of gases this is a very small increase in the concentration of the rare trace gas $CO_2$ and does not logically lead to the need for significant political and economic controls on emissions of $CO_2$.

The anthropogenic $CO_2$ can be calculated based on the IPCC figures (Harde, 2017a):

The total mean rate of carbon dioxide emissions is, Er = 760Gt/yr = 760Pg/yr [Peta is $10^{15}$]

The IPCC estimates, that from this total rate a fraction, Ea = 32.7 Pg/year results from anthropogenic sources (i.e. man-made sources). Thus, the anthropogenic part is:

$$\textbf{Ea (\%)} = \frac{32.7 \text{ Pg/year} \times 100}{760 \text{ Pg/yr}} = \textbf{4.3\%} \quad (1)$$

That is, with 420ppmv $CO_2$ in air the total accumulated anthropogenic part is (4.3%) ~18ppmv (4.19ppmv p.a.) which is negligible and can hardly affect the physical properties of the atmosphere (thermal conductivity, isochoric thermal diffusivity, heat capacities Cp and Cv or temperature etc.). The residence time in the atmosphere was calculated to be approximately 3 to 5 years and not the 100 to 1000 years claimed by the IPCC and others (Harde, 2017; see also criticism by Köhler et al., 2018).

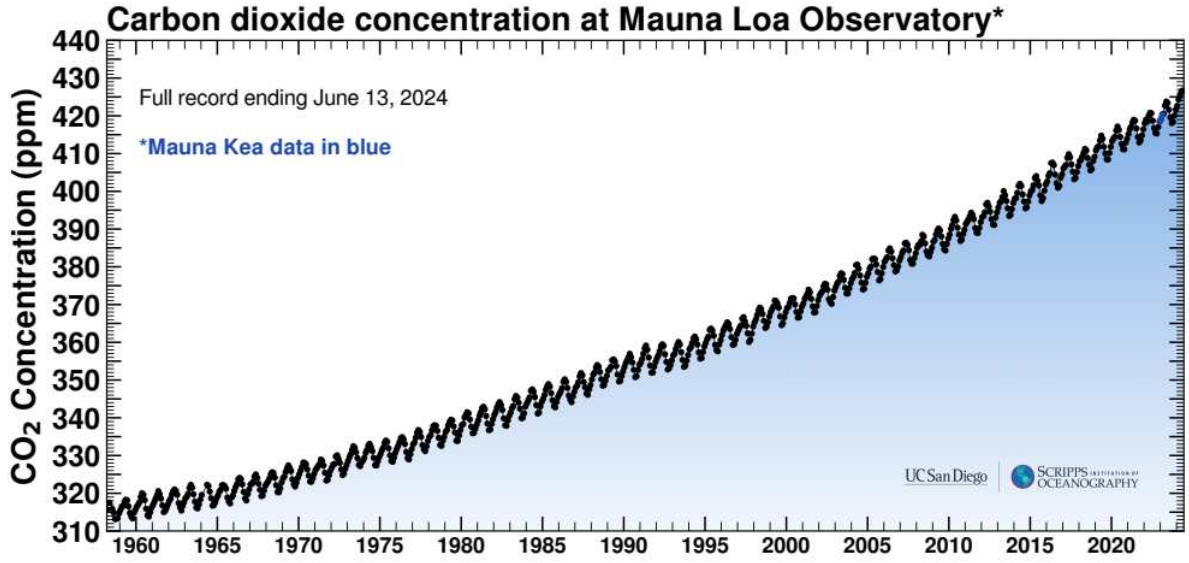


Figure 2. CARBON Dioxide Concentration at Mauna Loa Observatory (source: https://scripps.ucsd.edu/programs/keelingcurve/)

Several authors suggest differing amounts of $CO_2$ from man-made sources:

**Logistics**: 8Gt $CO_2$ (Alzard et al., 2019; Schwanen et al., 2011; Tacken et al., 2014) (i.e. 8Pg/year, ~25% from man-made sources or ~1% of total $CO_2$ in air) ~1.03ppmv $CO_2$ is due to logistics.

**Burning Fossil Fuels**: 10,000million tonnes of $CO_2$ (i.e. 10Pg), ~1.28ppmv $CO_2$ is due to burning fossil fuels (Parker & deBaro, 2019). These are extremely small concentrations and will have no measurable effect on the climate or the physical properties of the atmosphere.

**Food Supply Chains**: A recent article in Nature Food (Li et al., 2022) suggested:

> "*When the entire upstream food supply chain is considered, global food-miles correspond to about 3.0 $GtCO_2e$ [p.a.] (3.5–7.5 times higher than previously estimated), indicating that transport accounts for about 19% of total food-system emissions (stemming from transport, production, and land-use change)*."

The 3Gt$CO_2$e p.a. (i.e. 3Pg/year) is equivalent to ~0.38ppmv $CO_2$ in the atmosphere suggesting that the alarmism over such small concentrations of $CO_2$ is totally uncalled for.

**Human Breathing**: Human breath contains 4% $CO_2$ and about 5-6% $H_2O$. With 7 billion people breathing would produce ~0.1638ppmv of $CO_2$ in air. This can be calculated since the average resting adult produces 500g $CO_2$ per person per day (TOXNET) and will produce much more when active. This gives a baseline of 1.2775Pg per annum or 0.168% of the total or 0.1268ppmv resting and up to ~0.25ppmv $CO_2$ in air if most people are active. With the UN's forecast of 10.4 billion people in 2086 this would produce ~0.24ppmv with most people resting and perhaps ~0.5ppmv of $CO_2$ in air with most people active. Half the $CO_2$ emitted is lost to the ocean and biomass and does not appear in the atmosphere.

Noting that two periods in recent times reduced human $CO_2$ emissions by as much as 20% (covid 2020-2023 and 1970s oil crisis) yet the Keeling curve (figure 2) shows no evidence of that effect (https://en.wikipedia.org/wiki/1970s_energy_crisis).

The figures above illustrate how exaggerated claims are made for $CO_2$ based on the false assumption that $CO_2$ resides in the atmosphere for long periods and can affect the climate. These results are enough to falsify the ideas of anthropogenic global warming caused by $CO_2$ and shows how little human activity contributes to $CO_2$ emissions and concentrations in air. The argument is clear, that if the fictitious greenhouse effect were real for $CO_2$ the human contribution would have no measurable effect upon the climate in terms of global average surface temperature.

The residence time of $CO_2$ in the atmosphere is between 3.0 and 4.1 years using the IPCC's own data and not the supposed 100 years or 1000 years for anthropogenic $CO_2$ suggested by the IPCC summaries for policy makers (Harde, 2017) which contravenes the Equivalence Principle (Berry, 2019).

> "*These results indicate that almost all of the observed change of $CO_2$ during the industrial era followed, not from anthropogenic emission, but from changes of natural emission. The results are consistent with the observed lag of $CO_2$ changes behind temperature changes (Humlum et al., 2013; Salby, 2013), a signature of cause and effect*." (Harde, 2017a: 25).

Although Harde's (2017a) paper has been criticized (Kohler et al., 2018), the criticisms seem unjustified given the obvious rapid seasonal variations in the Keeling curve which suggests that uptake of $CO_2$ from the atmosphere occurs rather quickly. It is well-known that the residence time of $CO_2$ in the atmosphere is approximately 5 years (Boehmer-Christiansen, 2007: 1124; 1137; Kikuchi, 2010). Skrable et al., (2022), show that accumulated human $CO_2$ is 11% of $CO_2$ in air or ~46.84ppmv based on modelling studies. Berry (2020, 2021) uses the Principle of Equivalence (which the IPCC violates by assuming different timescales for the uptake of natural and human $CO_2$) and agrees with Harde (2017a) that human $CO_2$ adds about 18ppmv to the concentration in air. These are physically extremely small concentrations of $CO_2$ which suggest most $CO_2$ arises from natural sources. It can be concluded that the IPCC models are wrong and human $CO_2$ will have little effect on the temperature.

Unsurprisingly, Statistics Norway (2023) report that after examining 200 years of temperature measurements suggests that climate research operates with too short time intervals to be able to determine whether the influence of $CO_2$ on temperatures has a statistical correlation. Other factors such as cloud formation, solar activity and ocean currents have a significant impact.

## 4. Conclusions

Like many other researchers it was assumed there was robust science behind the greenhouse gas theory and that Net Zero was essential to achieve, but after investigation it now appears that the greenhouse gas theory is questionable and has been successfully challenged for at least 100 years (Gerlich and Tscheuschner, 2009). Much better explanations for planetary near surface atmospheric temperatures are available based on robust, empirically derived scientific laws such as the Ideal Gas law. Better assessments of the potential increase in temperature with doubling $CO_2$ concentrations are available and the calculated increase is small ~0.5°C (Coe et al., 2021; van Wijngaarden & Happer, 2019, 2020 and 2021; Sheahen, 2021; Schildknecht, 2020) and will remain very small with increased $CO_2$ concentration because the infrared $CO_2$ absorption bands are almost saturated and absorption follows the logarithmic Beer-Lambert law (Figure 1). Much of the work using the Hitran database has been tested against satellite measurements of the outgoing radiation from the Earth's atmosphere and the calculations are in almost perfect agreement (Sheahen, 2021). This suggests that the physicists are correct in their assessment of the likely very small increase in atmospheric temperature and therefore there is a strong case against Net Zero as it will have no discernible effect on temperature and the cost of Net Zero is huge. Therefore, the Net Zero project does not pass the cost-benefit test (Montford, 2024b; NESO, 2024). That is the costs are disproportionately high for little or no benefit. Thus, the correct response to a non-problem is to do nothing. The monies being wasted on Net Zero should be spent for the benefit of citizens (e.g. education, health care, public health, water infrastructure, waste processing, economic prosperity etc.). There are many other pressing public health problems from burning fossil fuels which should be addressed (e.g. air pollution especially particulates and carbon monoxide).

Better calculations of the human contribution to atmospheric $CO_2$ concentrations are available and it is small ~18ppmv (Skrable et al., 2022; Berry, 2020; Harde 2017a & 2017b; Harde, 2019; Harde 2014). The phase relation between temperature and $CO_2$ concentration changes are now clearly understood; temperature increases are followed by increases in $CO_2$ likely from outgassing from the ocean and increased biological activity (Davis , 2017; Hodzic and Kennedy, 2019; Humlum, 2013; Salby, 2012; Koutsoyiannis et al, 2023 & 2024).

> "*In conclusion on the basis of observational data, the climate crisis that, according to many sources, we are experiencing today, is not evident yet.*" Alimonti etal. 2022: 111.

Many researchers are addressing the '$CO_2$ and climate change problem' by suggesting decarbonization and other approaches such as Net Zero. $CO_2$ is more than likely not the temperature control and has a very minor to negligible role in global warming (The Bruges Group, 2021; De Lange and Berkhout, 2024; Manheimer, 2022; Statistics Norway 2023; Lindzen and Happer, 2024; Lindzen, et al., 2024).

The scientific literature was examined and found to provide several alternative views concerning $CO_2$ and the need for Net Zero. The objectives of this paper have been achieved and the conclusions can be briefly summarized:

1. $CO_2$ is a harmless highly beneficial rare trace gas essential for all life on Earth due to photosynthesis which produces simple sugars and carbohydrates in plants and a bi-product Oxygen ($O_2$). $CO_2$ is therefore the basis of the entire food supply chain (see Biology or Botany textbooks or House, 2013). $CO_2$ is close to an all-time low geologically (Wrightstone, 2017 and 2023) and controls on $CO_2$ emissions and concentrations in air should be

considered as very dangerous and expensive policy indeed. Net Zero is not necessary and should be abandoned.

2. The greenhouse gas theory has been falsified (i.e. proven wrong) from several disciplines including paleoclimatology, geology, physics, and physical chemistry. $CO_2$ cannot affect the climate in such small concentrations (~420ppmv or ~0.04%) and basing government policy on output from faulty climate models will prove to be very expensive and achieve nothing for the environment, public health, or the climate.

> *"There is no atmospheric greenhouse effect, in particular $CO_2$ greenhouse effect, in theoretical physics and engineering thermodynamics. Thus, it is illegitimate to deduce predictions which provide a consulting solution for economics and intergovernmental policy*." (Gerlich & Tscheuschner, 2009: 354).

3. The oceans contain approximately 50 times as much $CO_2$ as is currently present in the air (Easterbrook, 2016; Wrightstone, 2017 and 2023) and as such Henry's Law will work to maintain the dynamic equilibrium concentration in air over the longer term as the ocean will absorb and outgas $CO_2$ (Atkins & de Paula, 2014). Net Zero will, therefore, achieve nothing for the concentration of $CO_2$ in the atmosphere. If the volcanic sources of $CO_2$ are as Kamis (2021), the IPCC and others suggest many times the human contribution then Net Zero will have no measurable effect on atmospheric $CO_2$ concentrations. Net Zero should, therefore, be abandoned.

4. The contribution to greenhouse gases, especially $CO_2$, attributable to humans is extremely small, almost negligible (~4.3% or ~18ppmv total accumulation) and half is absorbed by the ocean and biomass. Other naturally occurring so-called greenhouse gases are present in very small/negligible quantities (e.g. $CH_4$, $N_2O$). The systematic attempts to eliminate these trace gases from the atmosphere by reducing industrial output, reducing farming, eliminating fossil fuel use, and changing the way human civilization lives is totally unnecessary – again the 'do-nothing strategy' is strongly recommended.

5. The sciences have been largely ignored by politicians and activists. There have been numerous failings of governments to take notice of scientific findings and they have succumbed to unnecessary pressure from activist groups (including the United Nations and the IPCC). Net Zero is just one example where costly efforts by governments will achieve nothing and not address the real problems of air pollution, public health, or economic well-being of citizens.

> *"There is not a single fact, figure or observation that leads us to conclude that the world's climate is in any way disturbed*." (Société de Calcul Mathématique SA, 2015:3).

6. Circular reasoning is used by the climate modelers. That is, the fictitious greenhouse effect is built into the models such that when the parameter of $CO_2$ concentration is increased then the temperature output of the models increases producing models which run relatively hot compared to natural variability. This reduces the so-called greenhouse effect to little more than a 'fudge factor' or 'parameter' within models which essentially gives you the answer that you set out to prove. This circular reasoning is hardly scientific enquiry and with data 'homogenization' and infilling of missing data begins to look rather peculiar. Climatologists need to recognize these issues, address the real reasons for climate change and offer genuine solutions to any real problems.

7. The claim of consensus is completely unscientific in its approach (Idso et al, 2015a). Noting that 31,000 US scientists and engineers signed the petition protest (Robinson et al., 2007), recently 90 Italian scientists wrote an open letter to the Italian government (Crescenti et al., 2019), and 500 climatologists and scientists signed an open letter to the UN Secretary General (Berkhout, 2019). All explaining that $CO_2$ is not the cause of climate change. There are thousands of academic papers and books questioning anthropogenic climate change with good data. Many other concerned individuals have looked at the evidence for anthropogenic climate change based on $CO_2$ and found it wanting (e.g. Davison, 2018; Rofe, 2018).

> "*If in fact 'the science is settled', it seems to be much more settled in the fact that there is no particular correlation between CO2 level and the earth's temperature*." (Manheimer, 2022).

and

> "*If you assume the Intergovernmental Panel on Climate Change are right about everything and use only their numbers in the calculation, you will arrive at the conclusion that we should do nothing about climate change!*" (Field, 2013).

The academic literature in science offers numerous and far better explanations for climate change than the fictitious greenhouse effect. Researchers should recognize this fact and start to look at dealing with the real causes of climate change. Net Zero is an enormously expensive solution to a non-problem and has no obvious redeeming features. The Net Zero policy is not financially sustainable and should be abandoned.

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**Acknowledgments**

The author greatly appreciated proof reading and suggested improvements to the paper prior to submission by Dr E. Ballantyne.

**Authors contributions**

Not applicable

**Funding**

Not applicable

**Competing interests**

The author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

**Informed consent**

Obtained.

**Ethics approval**

The Publication Ethics Committee of the Canadian Center of Science and Education.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

**Provenance and peer review**

Not commissioned; externally double-blind peer reviewed.

**Data availability statement**

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

**Data sharing statement**

No additional data are available.