A Simple Analysis Of Global Warming

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Summary

- In the following brief presentation the relationship between temperature and CO2 will be investigated from the view of determining the temperature change that would occur from burning enough methane to produce the observed CO2 rise.

- It will show that there is a close correlation between observed temperature change and observed CO2 levels, but and it's a big BUT, it implies that CO2 is a by product of current energy release processes and not a temperature driver. In short burning coal releases heat and CO2. Not burning coal releases CO2 which in turn releases heat.

- Under the assumption that it is Energy not CO2 that drives the observed change, it will question the validity of any CO2 management strategy.

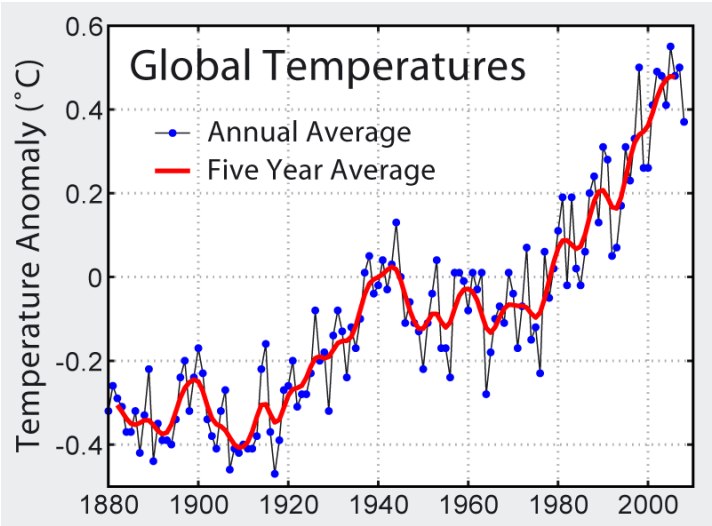
- Under the assumption that Energy from any source and Temperature are related it questions the viability of any temperature management strategy in an environment of increasing populations that are increasing their technology usage.

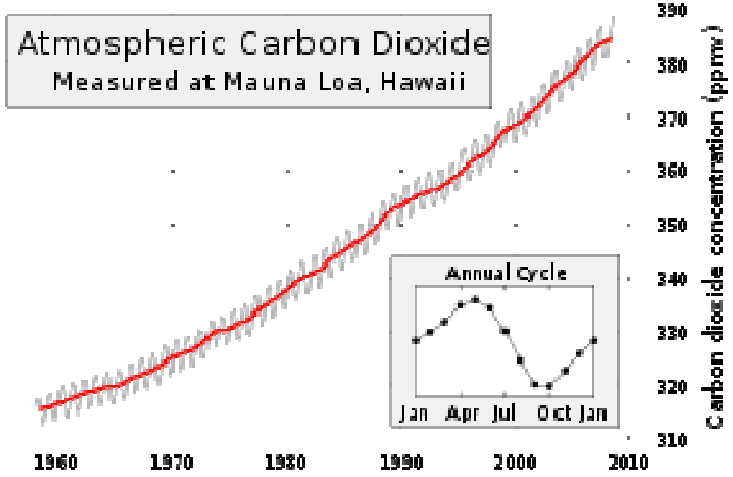
- It will also question the CO2 temperature forcing model which should to the limit of my understanding predict that temperature gain be proportional to the square of the CO2 levels.

The issue

- Two graphs. One showing temperature rising. One showing CO2 rising.
- The claim is that the CO2 causes the temperature because it's a "no brainer" they are both going up the same at the same time at the same rate.
- The whole world is focusing on the "If we cut back CO2, we solve the temperature problem".
- Easy Huh! Its obvious and lots of scientists have signed off on it.

- OK lets work it through.





Notes

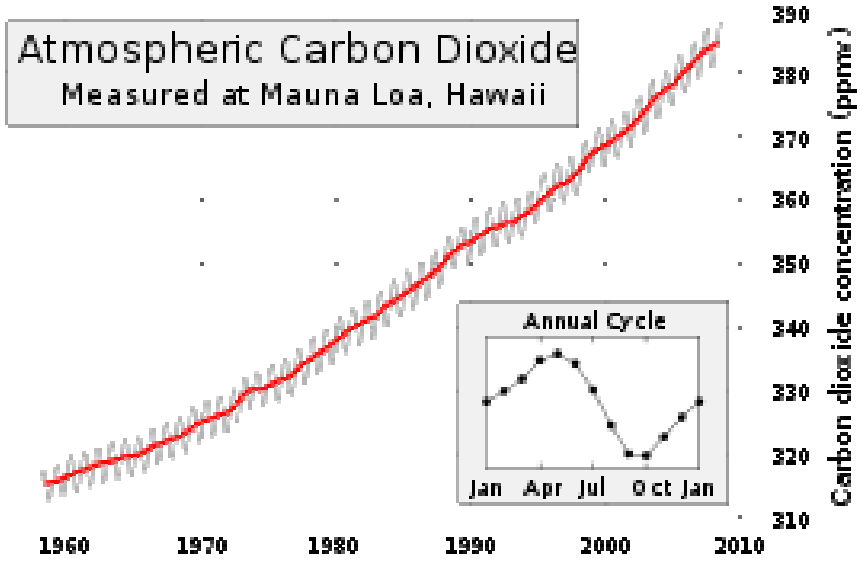
- In the following I am working from the view of thermal energy released by the process that releases CO2. It is simpler.

- The model originally was developed from working the other way around. That is by trying to work out the total Kinetic Energy gain of the atmosphere by whatever process and determining how much each CO2 molecule is responsible for. I was trying to understand the absorption - transmission model. This is included as an appendix.

Lets start again

- Lets start at the beginning. We have a graph of CO2 and it looks pretty straight so lets say that between 1980 and the year 2000 there has been a 30 ppmv increase in CO2 levels.

Increase of 30 ppmv per 20 years



Where did the CO2 come from?

- Before delving into complicated things like changes in atmospheric absorption/transmission due to CO2 variances, lets work out how the CO2 got into the atmosphere in the first place.
- Can we agree on burning? No debate here? We agree that burning releases CO2? Good.
- As we agree that if we burn fuel it releases energy and CO2 we should have no problem quantifying it. So for sake of example we will look at methane gas common to coal. There are other processes, but this will do for an approximation to see if we are even near the same order of magnitude.
- Methane burns using the relation

$$CH4 + 2O2 \rightarrow CO2 + 2H2O + 890\ kJ/Mol$$

- The energy released is 890 kJ per Mole.
- We know that there is Avogadro's number 6.02E+23 molecules in a mole of gas. So if we divide the energy released per mole, by the number of molecules in a mole, we can figure how much energy each CO2 molecule is responsible for.
- This ends up being 1.48E-18 Joules per molecule.

Heat of a single CO2 molecule

- Now this doesn't look like a lot, but in fact corresponds to a LOT of heat.
- If you look up your high school physics books you will know that Temperature and Kinetic Energy are related by

$$\Delta \mathrm{K} = \frac{3k}{2}\Delta T$$

- Where k=1.38E-23 is Boltzmann's constant
- So if we rearrange we get temperature as a function of kinetic energy as $\frac{2}{3k}\Delta K = \Delta T$
- Which means that our 1.48E-18 Joules corresponds to a whopping 71,497 degrees Kelvin or 71,244 degrees Celsius.
- The reason fires don't seem that hot is that the single "hot" molecule bounces off lots of other molecules and shares its Kinetic Energy/ Heat around.
- So lets find out what this initial heat does to the air where it eventually ends up.

Thermal contribution to the atmosphere

- Imagine that you collected all the CO2 released by burning a quantity of coal with no loss of energy. Then that container of CO2 would be at a whopping 71,244 degrees C.
- What we want to know is how much did the heat associated with the observed increase of CO2 affect the atmosphere.
- Going back to the graph we see that we have had a 30ppmv (That's parts per million by volume) increase of CO2 over the last 20 years.
- If we share the Kinetic Energy/Temperature of 30 units of hot CO2 out over a million units of gas we obtain a temperature increase of 2.14 degrees C.

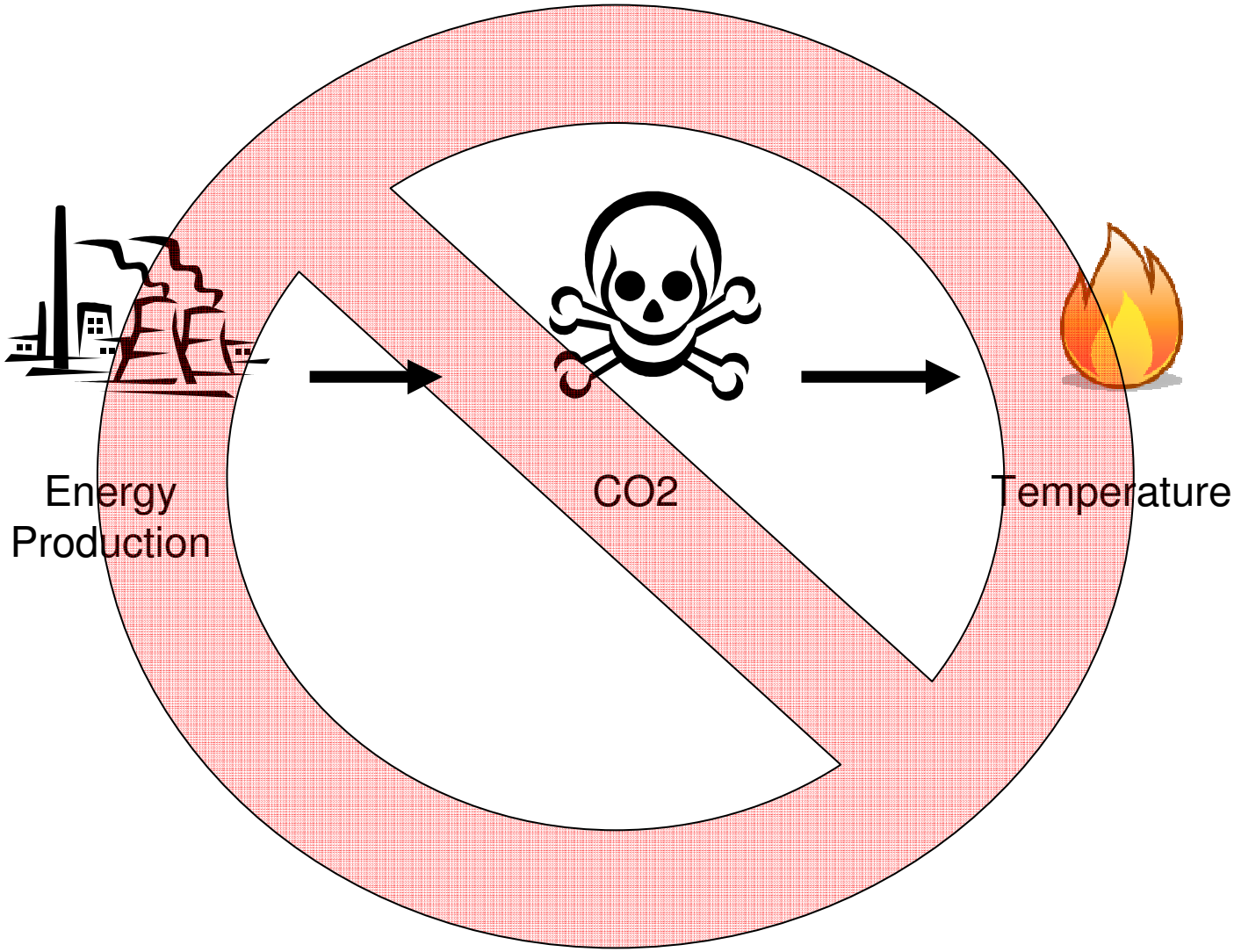
$$\frac{30}{1{,}000{,}000}\Delta T = \frac{30}{1{,}000{,}000}71{,}244 = 2.14$$

- If we go back to our graph we see that we have had approximately 0.5 degrees C temperature change over the same 20 years.
- Given the rough nature of the calculation, this is extremely close. I assumed only methane and I have not accounted for radiated energy, stored potential energy or sea temperature rises
- Under the assumption of total energy conversion we should have four times the temperature change than observed so where is the rest?

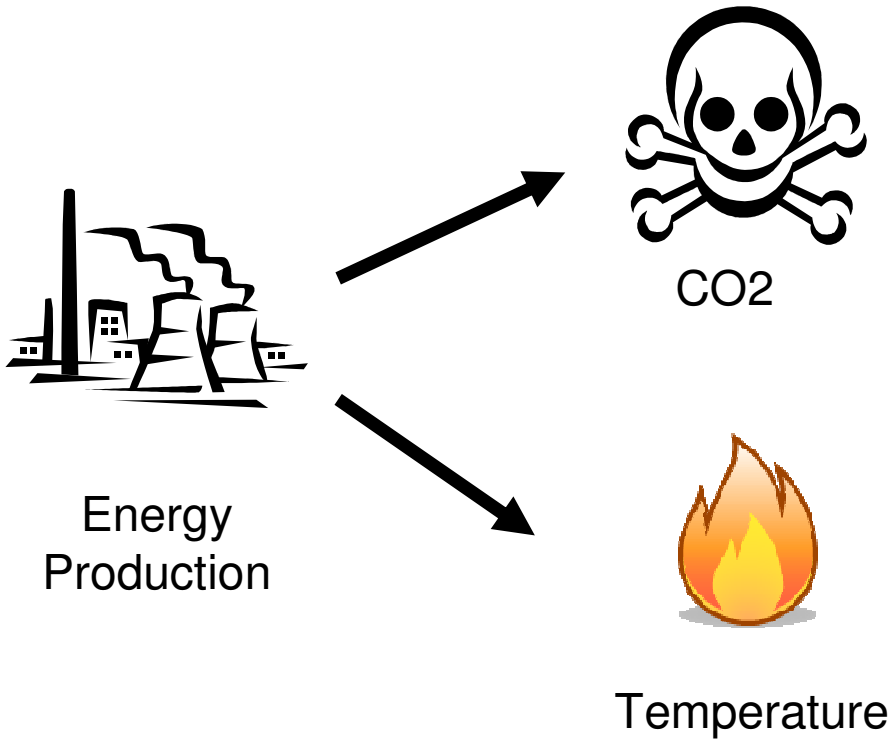
Missing energy

- Before getting excited lets look at this. The model says that only a quarter of the energy released by assuming a methane process can be accounted for in atmospheric temperature rises.
- Energy is conserved so it must be somewhere.
- Potential Energy. Nearly every manufactured item contains stored potential energy. A tile lifted to a roof contains potential energy that would be released if it fell off. A plastic has potential energy in the molecular bonds, you can release it by igniting the plastic.
- Radiated Energy. Some energy is lost through radiation from electric circuits, light emitted from TV screens etc.
- Energy used by humans? We cant count this because energy released by humans ultimately results in motion of something which in turn heats up the air or water.
- Heat in the oceans. Viable.
- So what is the problem? You have just proven the global warming hypothesis.
- Sort of. Read on.

Existing causal model



Proposed causal model

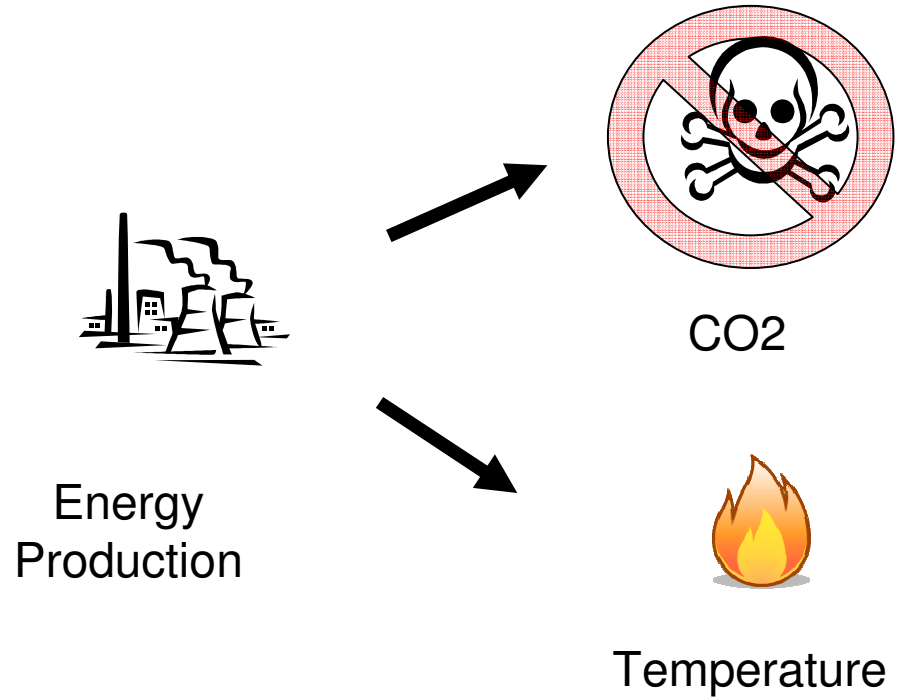


Some problems

- The first problem is that this has nothing to do with so called forcing, which if present would have to be added to this temperature.
- We cant say that energy released from burning that is of the same magnitude as the observed temperature change can be ignored and yet at the same time include the much more complicated and questionable forcing argument.
- Even if you assume the forcing argument, the energy released from burning still has to be accounted for. So if it is not in the atmosphere, where is it?
- The second most important problem is that it is energy production that releases CO2 and Energy.
- The CO2 management strategies, carbon trading etc assume that it is energy releasing CO2 that drives temperature.
- In other words the causality is all screwed up.

Proposed carbon reduction strategy

If it is the release of energy in the first place that drives CO2 and temperature. CO2 management strategies will do nothing. In fact will divert resources from where they should be.



Alternative energy

- The problem is that thanks to conservation of energy, all energy that is produced by any mechanism will eventually find itself in one of three forms. Stored as potential energy in for example something held up above the ground like a structure, radiation such as light and radio waves, or as heat which is really the kinetic energy of molecules.

- Anything that is heat will end up in the atmosphere or the oceans.

- You need to think in terms of sources and sinks of energy. Sources release energy, sinks absorb it.

- So nuclear – out, that is an energy source. Geothermal, out that is an energy source. Solar out that acts as an energy source.

- Thinking about it, I would argue that all forms of human energy use rely upon concentrating energy over time and releasing it in a usable burst.

- Even a grazing cow concentrates energy and releases it in a burst. There is simply not enough energy in a small area of grass to sustain a cow. It must move around allowing the grass where it was grazing previously time to recover. About the only things that can get enough energy in the area they occupy are plants and even they need to use leaves to concentrate energy over a broad area.

Renewables energy such as tidal and wind?

- At first glance it is possible that pure wind or tidal should work They take energy from the air and put it back. A nice short closed cycle.
- They act as an energy sink and as a source at the same time.
- The problem is that the Wind and the Oceans have built up their energy over time so once again we are concentrating energy and releasing it in a short burst.
- The alternative would be effectively perpetual motion. Use a wind generator to drive a fan that drives the generator. It wont work because friction from the system will heat the air.
- So in short my gut feel is that as long as humans concentrate energy and release it in a concentrated burst there will be energy winding up in the atmosphere and there is nothing that can be done about it.
- Further the energy will be proportional to the number of humans multiplied by the amount of technological leverage they are using.

Is it a problem?

- The question about whether it is a problem or not I am still not clear on. Historically we have been in an unusual flat spot, the Holocene.
- It seems to use a rough analogy like being becalmed in an ocean for years and freaking out when normal waves return.
- Whatever the case we will just have to live with it. Adaption is the key.
- King Canute could not hold back the tide. Perhaps we would be unwise to try it.

A technical issue

- The second problem is a little more technical.
- Going by the argument as I understand it of the “Greenhouse” effect. CO2 contributes to a process whereby heat is locked in. It doesn’t consume the CO2. As it builds up you get even more of a temperature gain. The longer the CO2 is there the greater the effect.
- In other words my naïve understanding is that the “Forcing Argument” says that it is the amount of CO2 multiplied by the time it is in the atmosphere that drives temperature gain.
- Or more simply if the CO2 levels are proportional to time. Then the temperature will change in a manner that is proportional to the square of time. So if we have a linear increase of CO2 as seen in the graph we can express this as.

$$C(t) = At$$

- Now if the change in Temperature T per unit time is proportional to the CO2 as a function of time we have.

$$\frac{dT}{dt} \propto C(t) = At$$

- And so the Temperature curve should be proportional to the square of time.

$$T \propto A \int_{Time} t dt = \frac{1}{2} A t^2$$

- This is not what I am seeing in the temperature graph related to the CO2 graph which shows a linear correlation and not a quadratic one.

Appendix: The original model

- The original model was more complicated. I was looking at how much energy could be attributed to each CO2 molecule in the atmosphere independent of process. I was thinking transmission absorption to get an idea of the “its such a small amount” argument.

- So if we have a 0.5 degree change in temperature how much is that per molecule of air.

$$\Delta \mathrm{K} = \frac{3k}{2}\Delta T = 1.5 \times 1.38 \times 10^{-23} \times 0.5 = 1.04 \times 10^{-23}$$

- So how much has each CO2 molecule contributed assuming a 30 ppmv increase in CO2? To do this multiply the energy of one molecule by a million to get the total energy and divide it over 30 molecules.

$$\frac{1 \times 10^{6} \times 1.04 \times 10^{-23}}{30} = 3.466 \times 10^{-19}$$

- How does that relate to burning? Lets say methane. CH4 + 2O2 → CO2 + 2H2O + 890 kJ/Mol

- We have 890 kJ per mole, so divide by Avogadro’s number to get $\frac{890 \times 10^{3}}{6.02 \times 10^{23}} = 1.478 \times 10^{-18}$

- The ratio of burning released energy to observed energy change from global warming?

$$\frac{Burning}{\Delta Temp} = \frac{1.478 \times 10^{-18}}{3.466 \times 10^{-19}} = 4.28$$

- Just remember we are using numbers of the order of 10^{23} here with a back of a beer coaster calculation so order of magnitude is good.

Final words

- Please feel free to pick this apart. Although I come from a math/physics background, I do not work in science, nor do I have access to the literature to have any idea of whether any of this has been analyzed and discarded before.
- If correct it is important because whilst supporting a temperature gain, it raises significant questions about the management strategy and in fact the whole Kyoto, Copenhagen protocol.
- If correct it also raises serious questions about the quality of the science performed on this issue, as well as the quality of the literature review processes.
- If correct how is it that such a basic argument has not been considered? And further how is it that such an error was unquestioningly propagated.
- If correct are we really that dumb?
- If correct how do we wind back the falsehood?
- And the absolute final word: If proven true – I would seriously question the funding provided to any agency or person who did not perform the appropriate due diligence and who contributed to the propagation of such a blatant error.