Thinking critically about Anthropogenic Global Warming

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Summary:

This document attempts a critical look at AGW.

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1 Introduction

I thought it might be worthwhile to step back, look at the whole planet and try to put things in perspective. The current push to reduce CO2 emissions is predicated on the following logic:

- [statement A] CO2 emissions caused by humans are rising.
- [statement B] Climate modeling based on the available data show significant global warming (AGW for short) caused by this CO2 rise.
- [statement C] The resulting severe climate change leads to much environmental damage, suffering and death.
- [conclusion] Thus CO2 emissions must be reduced.

This logic is used to provide a powerful mantra by environmentalists and others to focus attention on the need to live sustainably. While the goal may be a worthy one, both the logic and the premises are seriously flawed. The logic is flawed because it is incomplete. Just because A → B → C, ie A implies B which in turn implies C, it does not follow that if C is a bad outcome then we must negate A (the conclusion). In truth, there are a lot of other aspects that need to be factored in before a conclusion on appropriate actions can be reached. For instance, there is an opportunity cost to any action, ie a cost for things not done because needed resources were directed elsewhere. Quantification and comparison of risks and benefits are needed to reach a conclusion. Some people have argued for the precautionary principle, which states that even if we are wrong in our fears the consequences are so large that we should act to protect ourselves against the possibility. That's fine as long as the opportunity cost is acceptable. In this case, this is neither evident nor has it been demonstrated.

The premises too are seriously flawed. Yes, human produced CO2 emissions are rising and will likely rise further still. So we will take statement A as true.

At issue is the validity of the climate models. The IPCC scientific report sections admit to the large uncertainty in the climate models. It has also been independently shown that major phenomena are missing or are poorly modeled (clouds for instance). The treatment of the temperature data has been shown to be seriously flawed making the temperature history constructions based on proxy data and erroneous temperature station data unreliable. Even the IPCC knew better than to make predictions with these models. But they did make projections – ie stylized bounding scenarios illustrating what might possibly happen should key parameters like the value of the CO2-ΔT forcing functions be a certain value. But that does not mean that it is that value or that the real world is reflected in the model even if it were. Just to illustrate how easily the projections could be wrong, the CO2-ΔT forcing function was estimated by back fitting the models to reproduce the temperature reconstructions assuming that there were no other significant effects going on in that time period. Oceans have a very large thermal capacity compared to the atmosphere so that ignoring of the prior periods is not likely correct. Couple that with the erroneous temperature reconstructions and you get a CO2-ΔT forcing function that is not likely linked to reality.

I think the validity of the models (any models really) depends on the degree to which climate is an open or a closed system. In a closed system the long term is bounded by some constraint, usually energy or material. Throw a ball into the air and you know its maximum possible height by the initial imparted energy even if you can't predict fully its detailed path. That is a closed system. But if there is an external forcing function that is a function of local properties (the ball

is light and the updraft wind is strong, intermittent and highly dependant on height) then the long term is very dependent on the short term. That is an open system. There are indeed many feedback mechanisms in the climate that make the climate closed to some extent, and to the extent that it is closed it is easier to model. But there are many effects that tend to make it an open model. To the extent that the climate is open, the models are susceptible to runaway errors in predictions. Cloud modeling is a big unknown that is an open effect given its connection to the sun and cosmic ray variation. Even without the sun effect, just the ice crystal formation details (extent and height) can make clouds be more reflective vs. more insulating.

The current climate models are not validated - see [O'Keefe]. That fact alone should be enough to call a halt to this affair.

Thus the projections are not reliable. So statement B, that CO2 rise will significantly alter climate, is not substantiated. A more likely reality is that any warming we do see is part of our gradual emergence from the last ice age.

Nor is it evident that a changing climate cannot be accommodated by humans. Our adaptability is well proven by past events which have, at times, been large and imposed on humans with far less resources than we have today or the better ones we will have tomorrow. So statement C, much damage, suffering and death, is not substantiated.

And even if there were no other complications, it does not follow from the logic that CO2 can be reduced even if we wanted to. It is not likely that we could reduce CO2 globally even if we tried. Barring some major technical breakthrough, the emergence of China and India as developed nations nearly guarantee rising CO2 emissions, such is their overriding need to raise the quality of life for their people. So our chances of actually achieving CO2 reductions in the coming decades are very slim indeed. Further, the CO2 reduction measures would be quite disruptive to existing economic structures and, thus quality of life, if they were pursued with sufficient vigor and extent to actually achieve global reduction.

So, in short, although human caused CO2 levels are rising,

- it is not clear that this increase is changing the climate significantly
- and even if it is, it is not clear that we should try to do something about it (compared to other priorities)
- and even if we decided that it is a priority, that we can do anything about it anyway.

2 Quantification of risk

How many people are projected to die in the global warming scenarios? A prediction would be better but it seems that is not in the cards. How many per hour? By way of comparison, about 1000 people per hour die of hunger related causes worldwide. We need to include the frequency in the estimate. Risk is defined as frequency x consequence.

Let's say the mean global warming projection (which, as discussed above, is a flawed projection) says 100 million people will die over a span of 100 years (in spite of our proven ability to adapt) and the probability of that projection being true (considering all the possible modeling errors due to phenomena not modeled and lack of proper validation) is 10%. I think that means that the risk is (0.1/100) x (100 *10^6) = 100,000 deaths per year or about 12 people per hour. Now of course I made those numbers up just to illustrate the calculation. I'd be interested in hearing

some proper estimates. But even with 100% certainty of 100 million over 100 years, we are still 'only' at 120 people per hour. 12 per hour is a great tragedy to be sure, but nowhere close to the current 1000 per hour due to world hunger. That's 1000 per hour with 100% certainty. No modeling required. And of course there are unfortunately far too many other world issues needing our attention as well.

Yes, granted, mine is a terribly simplified analysis. Call it a caricature artificially set up to make a point. The rates I used are neither constant nor independent. I also did not include a discount rate for the future worth of a human life. When a small discount rate of 1% is used, it dramatically lowers the risk going 100 years out but that just strengthens my case. Nor did I take into account the low probability that pouring large sums into CO2 emission reductions in the developed world will do much good. Remember China and India will surely continue to emit a lot as they get through their dirty growth period.

The above risk estimate is just a simple way of illustrating that it is insufficient to say that man-made CO2 emissions causes global warming to such an extent that consequences occur and that therefore we should do some response to reduce CO2. We need to include the probabilities / frequencies in the calculation of actual risk and we also need to compare the risk to other risks before we can decide where we can do the most good.

3 Does the end justify the means?

Some people, especially those with strong noble cause convictions not saddled with any inconvenient doubt, have argued that we should not speak out against the bad science and the bad logic behind the AGW movement because even if AGW were to be conclusively proven wrong, the goal of CO2 reduction remains valid. The bad guys (the industrialists for instance), would seize such an opportunity to do further environmental damage in the name of progress.

That is a very slippery slope and I refuse to partake. If we are to deserve the trust people put in science and academia, we cannot be selectively objective.

4 References

[O'Keefe] – "Climate Models: A Primer", by William O'Keefe and Jeff Kueter, George C. Marshall Institute, Washington, D.C., 2004

5 Definitions

Definition of terms:

- AGW Anthropomorphic Global Warming
- IPCC Intergovernmental Panel on Climate Change

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