

Figure 1 --Temperature projections from Climate Models – IPCC 5th assessment report

 Figure 2 - NASA global surface temperature data plot **– (***NASA Headquarters release No. 12-020 - now archived*

Full Response to comment

# The idea that findings and opinions that are being disseminated and promulgated by the IPCC on climate change, the foundation of which are climate models, should just be accepted, by civil engineers in general or by ASCE in particular in the face of empirical data and information that is clearly divergent from those opinions, is neither “right nor safe”. John Stuart Mill in On Liberty stated: *“He who knows only his own side of the case knows little of that. His reasons may be good, and no one may have been able to refute them. But if he is equally unable to refute the reasons on the opposite side, if he does not so much as know what they are, he has no ground for preferring either opinion... Nor is it enough that he should hear the opinions of adversaries from his own teachers, presented as they state them, and accompanied by what they offer as refutations. He must be able to hear them from persons who actually believe them...he must know them in their most plausible and persuasive form.”*

# The now widely held perception that human source carbon dioxide emissions are the primary cause of the ongoing global warming, arose based on a logical hypothesis (circa 1980-90) stemming from the observed temporal juxtaposition of (1) the great and sustained increase in CO2 emissions post 1950 and (2) a period of significant planetary warming (1979-1998). This hypothesis, although not able to be experimentally tested or made subject to rigorous proof according to the scientific method, was nevertheless shored up via the climate modeling studies commissioned by the International Panel on Climate Change (IPCC). The IPCC was appointed by the United Nations and charged with showing "The Effects of Human Activity on Climate Change". The IPCC was not charged with the onerous task of proving this premise or hypothesis but rather with demonstrating and reinforcing the premise of anthropogenic global warming. Through their periodic assessments, largely based on climate modeling studies with input parameters and weightings selected by their modelers, they have been highly successful in fulfilling this charge. The IPCC climate models were also employed to predict future global warming outcomes. Long term climate change forecasting via modeling is an extremely complex exercise as there are many parameters that contribute to climate that are included in the models and their relative influence and interaction / feedback are not well known or established. The inputs to the models by various investigators are thus subjective. Interestingly, and perhaps predictably based on the IPCC charge, the models have typically greatly overestimated the actual warming that has been experienced since the IPCC began its work around 1990.   (See Figure 1 showing temperature projections taken from the 5th IPCC report in the attached file.)

# figure1

# In contrast to the two major conclusions drawn or inferred from the IPCC assessments that: (1) CO2 emissions are the primary cause of the ongoing global warming and (2) that without a radical diminution of global CO2 emissions a planetary warming catastrophe will result, the empirical data paint a completely different picture. Although it certainly seems presumptive to challenge these conclusions that have literally swept the nation and world and have become ingrained in people’s minds, the actual data, information and facts belie these conclusions. And, it is not really presumptive inn that there are indeed thousands of professionals, climatologists, scientists, engineers and geologists, that do not subscribe to the IPCC claims and opinions and many articles as well as books have been written that present data and information that countermands the IPCC conclusions. To borrow Mark Twain’s quote which he modified from John Adams and substituting “models” for “statistics”: Facts are stubborn things but “*models”* are pliable. Here are 3 relevant pieces of factual data and information.

1. Global warming is ongoing and has been since the end of the Little Ice Age 1700-1750. But NASA temperature records (see figure below) show CO2 emissions are not driving global warming. Analysis of temperature and CO2 data (1880 to present) show, that despite CO2 emissions steep rise post 1944, the overall warming rate has not notably changed. Data show that from 1917 to 1944, when CO2 emissions were minor, the global mean temp. rose +0.68 0C (0.025 0C per year) over the period. The next rise in global temperatures occurred from 1979 to 1998 and was +0.47 0C over that period (also a rate of +0.025 0C per year). These two warming periods in the post-1880 temp record had identical rates even though 462,000 Million Metric Tons (MMT) of CO2 was emitted from (1979-1998) and a total of 750,000 MMT of CO2 emissions since 1944. Thus, there were huge increases in CO2 emitted but no increase in global warming rates. Further, no CO2 emissions effect is evident in the temp record from 1944 to 1979. CO2 annual emissions actually quadrupled from 5000 MMT (1944) to 20,000 MMT (1979) while global cooling occurred! Global temperatures were below the 1944 temp. from 1944 to 1979. Thus, the facts are that: (1) For 35 years right after CO2 emissions ramped up, global temperatures lowered, and (2) the global warming rate from 1917-1944, prior to much higher CO2 emissions was the same as the global warming rate from 1979-1998. Thus, unlike climate models with subjective input, empirical data show CO2 is not driving global warming.

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2. The last glacial period began about 120,000 years ago and reached a glacial maximum about 21,000 years ago. Average global temperatures dropped about 10-12 degrees centigrade (C) over that period. Then, rapid warming began and sea levels rose markedly. Over the next 15,000 years sea levels rose about 400 feet (122 meters) and the temperatures rose about 10 deg. C. Then the current, warmer interglacial period began and has lasted 10,000 years to date. Compared to the glacial periods, global temperatures and sea levels are relatively stable during interglacials. However, even during interglacials there are warmer and colder cycles of significance. For example, there is documented, experiential history that prior to our Current Warm Period (CWP), there was the Roman Warm Period, the Dark Age Cool Period, the Medieval Warm Period, and the Little Ice Age, which immediately preceded our current warming cycle. The Greenland Ice Sheet Project disclosed that to date there have been 10 cycles of warming and cooling in the current interglacial, (the Holocene epoch). Historic records confirm sea level changes and movements of people in these periods of warming and cooling within our current interglacial period. Currently we are still heading up on the warming portion of the 10th cycle which has been ongoing since about 1650-1700.

The data from the Greenland Ice Sheet Project also reveal that our current warming is neither unusual or unprecedented. Each of the previous interglacial warming cycles, none of which were influenced by CO2 emissions, reached higher global temperatures than we are currently experiencing. Other research on the Greenland Ice Sheet indicated that temperatures during the last interglacial (the Eemian), about 120,000 years ago, were 80C (14.40F) warmer than today. These data clearly reveal that the current warming cycle is proceeding in a manner similar to those previously experienced in this interglacial. Thus, these data belie the notion that CO2 emissions have already caused global temperatures to reach unparalleled levels and are driving global temperatures toward planetary collapse. (Gregory Wrightstone – geologist – author of Inconvenient Facts was my source for data on the Greenland Ice Sheet Project)

3. Two factual pieces of information are very significant with respect to the second major conclusion of the IPCC Assessments, namely that “radically cutting of worldwide CO2 emissions will address the projected global warming catastrophe”. These facts are:

* Natural variability in climate over the last 740,000 years has produced 8 cycles of glaciation with intervening interglacial periods and as described above natural variability produced 10 warmer/colder cycles within our current interglacial. If one adheres to the anthropogenic global warming premise, it follows that CO2 emissions at some point, within our current warming cycle, had to take over primary control of global warming and supplant natural variability. Juxtaposition of the history of global temperature data and CO2 emissions shows that date would have to have been after 1944 (when carbon dioxide emissions escalated) and could not have been before 1979 as global cooling was occurring from 1944 to 1979. The sharp rise in global temperatures post 1979 would thus suggest that 1979 is the logical date of CO2 primacy.
* Beginning around 1880 human source CO2 emissions began to slowly and gradually increase and then around 1944 the yearly rate of increase rose substantially and that rate of increase has essentially been sustained over the last 70 years. (Note: The rate of yearly increase of worldwide CO2 emissions continued despite the IPCC warnings (circa 1990) and despite the fact that both the United States and the European Union have basically not increased their emissions for the last 25 years). The significance of this steady, unabated increase in human source CO2 emissions since 1880 relative to the assertion that cutting CO2 emissions will curtail global warming is **that there has been no possibility for testing, observing or verifying the planetary warming response to a reduction in CO2 emissions.** The assertion that cutting CO2 emissions will address global warming comes via climate models. The model inputs are the contributions of various parameters that are believed to influence global warming. One of these parameters is the impact of CO2 emissions. Which, in accordance with the fundamental premise of anthropogenic global, is presumably given substantial weight. This weighting assignment in turn backs the model predictions of increased global warming with increasing CO2 emissions. Then, when the amount of contributing CO2 emissions is reduced or removed from the model inputs, it follows that the warming would be reduced. Simply put, if CO2 emissions are modeled as substantive contributors to the current and future global warming then cutting them will equally reduce future global warming.

Thus, the commonly accepted assertion that cutting CO2 emissions will curtail global warming is not based on physical or empirical evidence but rather is the product of climate modeling assumptions that replicate the basic premise and original charge to the IPCC to show the degree of effect that human activity (e.g. CO2 emissions) has on climate.

Paradoxically, even though there has never been a period of decreasing CO2 emissions since 1880, there was a period of decreasing global temperatures between 1944 and 1979. If indeed lower CO2 emissions result in lower global temperatures, one would have expected that this “lower global temperature period” from 1944-1979 would have correlated with lesser CO2 emissions, but in fact during that period CO2 emissions quadrupled.

Combining the above two pieces of factual information reveals the relatively startling conclusion that **if** the premise that CO2 emissions has taken over primary control of global warming and supplanted natural variability is true, then that take over demonstrably occurred some time ago and we are will past doing anything substantive about it.

Here is the data:

Table 1 – **Change in global warming vs cumulative amount of CO2 emitted (1917-2015)**

 Period CO2 emitted CO2 emitted in Accumulated CO2 Temp. change Temp. rise /

 Annually - MMT the period MMT emissions MMT + or - year

1917-1944 3,500 -5000 114,750 114,750 + 0.68 deg C +0.025

1944-1979 5,000-20,000 287,500 402,205 - 0.05 deg C

1979-1998 20,000-24,000 462,000 864,205 + 0.47 deg C +0.025

1998-2013 24,000-32,000 420,000 1,284,000 - 0.06 deg C

1998 -2015 24,000-32,000 476,000 1,350,000 - 0.30 deg C UAH satellite

Based on NASA’s recorded history of global warming, the anthropogenic CO2 effect would have logically begun with the sharp rise in the global temperatures after 1979 on the heels of the great amounts of carbon dioxide emissions accumulated by 1979. Considering CO2 emissions as causative of enhanced global warming before that time would not make sense because global temperatures had remained below the 1944 level for the preceding 35 years. So, if CO2 emissions cause enhanced global warming it would follow that by 1979 enough human CO2 emissions had been introduced into the atmosphere for them to become the primary driver of the observed steady rise in global temperatures from 1979 to 1998. This period of temperature rise generated and sustained the ongoing global warming concerns.

The accumulated quantity of CO2 emitted by 1979 was about 400,000 MMT. Thus, following the theory of anthropogenic warming one could deduce that when CO2 emissions reached that cumulative total of 400,000 MMT (raising the atmospheric CO2 level to about 330ppm) their effect overtook the other factors producing natural global temperature variability. Following that logic and continuing to recognize the cumulative effect of the portion of the CO2 emissions that reach the atmosphere remain there for over 100 years, two corollaries follow: (1) Continued accumulation of CO2 emissions post 1979, which as of 2018 had reached 1,450,000 MMT would have not just sustained but also accelerated the annual rate of global warming, and (2) most importantly, with respect to the claim that cutting CO2 emissions now will substantively stop global warming, **the quantity of human source CO2 emissions in the atmosphere would have to be reduced to a level below the level existing in 1979**. Since the accumulated human source CO2 emissions now stand at over 1,500,000 MMT and are increasing at an annual rate of 33,000 MMT per year and the current atmospheric level of CO2 in the atmosphere is at 410 ppm, accomplishing such a task is unreasonable to fathom. To return to a point where ostensibly CO2 emissions were not producing global warming, would mean not only reducing worldwide emissions to minimal values but somehow removing from the atmosphere the portion of the over 1,000,000 MMT of CO2 emissions added over the last 40 years. If indeed our CO2 emissions are causing grave, perilous global warming consequences, **then that ship has sailed and, realistically, there is no recalling it back to port**. In light of the vast amounts of CO2 emissions that human activity has already emitted the claim that a drastic reduction in CO2 emissions in the next 12 years would effect a significant change in global warming appears to only be an illusory projection of climate models.

Fortunately, empirical temperature data clearly indicate that such a task is not necessary since (1) global warming since 1979 does not indicate an acceleration in rate consistent with a tripling of the amount of human produced CO2 emissions present in the atmosphere and (2) increasing CO2 emissions do not consistently correlate with increasing / decreasing global temperatures over the modern period of record. The empirical evidence shows that the massive quantities of CO2 emissions that have already been introduced into the atmosphere have produced no drastic global warming effects. Global temperatures have marched on at a pace at or only marginally above what had occurred previously occurred. Further based on ice core records global temperatures in our interglacial have not yet reached the peaks evident in earlier global warming and cooling cycles.

The good news with respect to the global preoccupation with assessing almost every activity in terms of its carbon footprint is that many of the resulting physical actions that have taken place are beneficial on their own accord even if they have no effect on global warming. These actions include reducing known pollutants from fossil fuel, constructing / manufacturing sustainable products and facilities, developing specific works to address global warming effects (sea level rise) and developing alternative energy sources.

Thanks for reading this note, Larry Von Thun

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