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Review of the Economics of Climate Change

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Greenhouse Gases and Climate Change: Is Carbon Dioxide a Threat?

Every six months or so another prediction of abrupt and dramatic climate change, driven by our use of fossil fuels, appears in the media. The most dramatic example was the science-fiction film, *The Day After Tomorrow* where 'global warming' was proposed as the trigger for rapid onset of the next ice age and purported to be a warning of the dangers of not reducing anthropogenic carbon dioxide emissions. There are many books of a pseudo-scientific nature linking dramatic climate change and its impacts to increasing concentrations of atmospheric carbon dioxide.

Sustaining all these media events are the Assessment Reports of the Intergovernmental Panel on Climate Change, or IPCC. Since its formation in 1998 the IPCC has issued three reports, each one more alarmist than the previous one, the most recent having been released in Shanghai in January 2001. At the press conference in Shanghai a graph of global temperatures from 1000 AD to 2000 AD was displayed on a giant screen. This graph showed a more or less constant global average temperature from 1000AD to 1900 AD, and from 1900 to 2000 AD depicted a sudden and sustained temperature increase. The graph looked like an ice hockey stick lying on

its back with the blade pointing up to the sky; its purpose was to make the claim that 20th century warming was unprecedented, due to carbon dioxide emissions, and a cause for alarm.

It has now been established beyond argument that this hockey stick is a fraudulent representation of past global temperatures. But the IPCC has not acknowledged any misrepresentation. The IPCC and its adherents refuse to discuss issues and evidence contrary to the published reports. There are ongoing efforts by the climatology establishment to suppress any meaningful debate on the science of greenhouse gases. Governments use the IPCC as an ex cathedra authority and refuse to consider arguments put forward that challenge the anthropogenic global warming hypothesis.

The first serious problem with the theory of anthropogenic global warming is that tropospheric temperatures, which have been measured by satellites since 1979, show no significant upward trend. This is a major embarrassment for the IPCC because, according to their global warming hypothesis, the greenhouse gases (water vapour, carbon dioxide, ozone, methane, oxides of nitrogen, and chlorofluorocarbons - CFCs), should warm the troposphere. However there is no evidence of warming despite the measured increase in carbon dioxide concentration.

There are, however, identifiable fluctuations in tropospheric temperature on multi-year timescales that can be directly linked to natural variations in sea surface temperature of the tropical Pacific Ocean.

The second serious problem is that the energy radiated by the earth into space is predicted to decline as carbon dioxide concentration increases, thus retaining energy within the climate system and warming the Earth. The available satellite measurements show just the opposite; over the warm tropics the radiation to space has substantially increased. This clearly demonstrates that natural variability within the climate system has dominated any recent anthropogenic effects.

The third serious problem is that many of the prophecies of dangerous physical and biological impacts of global warming cannot be sustained. For example, it is claimed that a range of mosquito-borne diseases will spread beyond the current habitats of the hosts and bring death and disease to currently healthy populations. This ignores that such diseases had global coverage, even reaching to Archangel on the Arctic Circle, before the widespread implementation of public health measures. There are also the claims that global warming endangers the Antarctic and Greenland ice sheets. This ignores the fact that the ice plateaux are at several kilometres elevation and even in summer the surface temperatures are more than 10oC below freezing - the slow melting of the coastal periphery of Greenland that is observed is no cause for alarm.

Under normal circumstances the empirical overturning of a scientific theory would lead to its abandonment. The search would begin for new explanations of how, under the influence of the sun's energy input, the atmosphere, the oceans, and the landmasses of the planet react with each other to produce the climate we enjoy. But this is not what is happening. So many scientific and political reputations have been built on the greenhouse theory of global warming that we find that a huge campaign of scientific denial has developed. Those who challenge the greenhouse establishment are subjected to ad hominem attacks, including being equated with holocaust deniers and paedophiles.

The climate system is extraordinarily complex and there are many gaps in our knowledge and understanding. We do know, however, something about the basic parameters that govern the energy flows into and out of our planet.

We do know that the temperature of the earth (and all life on earth) is sustained by solar energy received mainly over the tropics. The global variations of temperature are driven and regulated by the transport of heat energy from the tropics to the polar regions by atmospheric circulations and by ocean currents such as the Gulf Stream.

a.. The greenhouse gases absorb and emit radiative energy at particular frequencies in the infrared portion of the

electromagnetic spectrum because of their molecular structure. The emission is also proportional to the fourth power of temperature. Temperature decreases with altitude in the troposphere and, as a consequence, the direct effect of the greenhouse gases is to cool the atmosphere.

b.. The natural cooling of the atmosphere by greenhouse gases and radiation processes is offset mainly by the release of latent heat during atmospheric overturning and rain formation.

c.. The earth's surface is cooled by evaporation, especially over wet forests and oceans. The rates of evaporation and loss of latent heat from the ocean surface increases exponentially with rising surface temperature. This non-linear relationship puts a practical upper limit on how warm the tropical oceans can get, and explains why the warmest tropical ocean temperatures have remained constant at about 30C over the past 30 years.

d.. Over the tropics, deep convection directly links atmospheric temperatures to the temperatures of the warmest ocean surfaces. Satellite and weather balloon data independently confirm that the tropical atmosphere has not warmed over the past 30 years, and this stability is consistent with the near constant temperature of the warmest surface waters.

e.. While there is a natural upper bound to tropical ocean temperatures, the temperatures over middle and higher latitudes are regulated by the rate of heat transport from the tropics. Global average temperatures were higher in the Medieval Warm Period (800 - 1300 AD) than they are today, and were colder during the Little Ice Age (1500 - 1850 AD). Ocean currents and upwelling of cold sub-surface water can lead to changing tropical ocean temperatures, changes to the heat transfer between the oceans and the atmosphere, and thus to variations in polar temperatures and ice mass.

f.. Overall, water vapour (the primary greenhouse gas) and the hydrological cycle (evaporation, transport of water vapour, and precipitation) are essential for maintaining the earth's surface at a temperature cooler than it would otherwise be, and they provide a powerful negative feedback mechanism which contributes to climate stability.

g.. Carbon dioxide cycles naturally through the atmosphere and the

land mass through plant growth and decay; the total exchange in each direction is calculated to be about 120 Gigatonnes of carbon (GtC) per year. Over the oceans, carbon dioxide is dissolved in the cold surface waters of the polar regions and is returned to the atmosphere by the relatively warm upwelling waters in the tropics; the annual rate of exchange is about 90 GtC per year.

h.. The annual emissions of carbon dioxide to the atmosphere resulting from human activities are near 7 GtC, less than 2 percent of the total carbon flux. Atmospheric carbon dioxide contains about 730 GtC. Changes in the natural carbon flux, as well as human activities, have led to recent increases in atmospheric concentrations of carbon dioxide.

i.. Before industrialisation took place in the West during the 19th century the atmospheric concentration of carbon dioxide was about 280 ppm. Today the figure is 380 ppm, the greatest increase having occurred since 1960. However carbon dioxide is a minor greenhouse gas in comparison compared to water vapour. The concentration of water vapour varies naturally over a wide range of amplitudes with regions and seasons and yet the Earth's climate is remarkably stable.

j.. Carbon dioxide is not a pollutant. It is basic to photosynthesis and is essential to plant, tree and marine growth, and essential to animal and human well being. Millions of years ago, when there was a much higher concentration of atmospheric carbon dioxide than at present, forest growth increased dramatically and eventually decayed to form extensive coal deposits. (Carbon dioxide should not be confused with carbon monoxide, an extremely poisonous gas that will cause death in small concentrations) The Kyoto Protocol was designed to establish a global regime for an internationally regulated process to decarbonise the global economy. Today the protagonists of Kyoto are arguing that a 60 percent cut in anthropogenic carbon dioxide emissions is required to bring about "climate stability". There is neither scientific evidence nor accepted theory to support their proposal that climate is becoming more unstable or more dangerous. But there can be no doubt at all that the economic consequences of such a decarbonisation regime would be devastating, and would not survive the democratic processes of political life that we

hold dear. Current proposals for wind power, carbon geo-sequestration, solar and tidal power, are all burdened by high costs and their forced implementation is to be avoided. Adding costs into the global economy is a barrier to economic advancement and the elimination of hunger and poverty in developing countries but has no environmental benefits.

Other influences on Earth's temperature The Earth is slowly cooling as heat from the core is conducted to the surface. Heat is also released during volcanic eruptions but the magnitudes of both are relatively small on the timescales of consideration.

The main source of heat for Earth is the nuclear furnace of the Sun. As the intensity of the Sun's radiation varies so too will the heat received by Earth. The net heat received at the Earth's surface also varies with the periodically changing orbital characteristics relative to the Sun, the atmospheric aerosol concentration (especially those aerosols released during volcanic eruptions) and the variations of cloudiness (especially with changing cosmic ray activity).

Earth's temperature cycles The recent rate of warming and the current global average temperature have been exceeded in the past. There is ample evidence from navigation and colonisation records that Arctic regions at least were warmer about 1,000 years ago, and proxy records indicate that the Earth was warmer between 8,000 and 4,000 years ago. The current relatively warm period that has lasted more than 8,000 years (the Holocene) is typical of the abrupt periods of warming (interglacials) that have punctuated the generally glacial conditions of the past several million years.

Worldwide, the peripheries of polar ice sheets and mountain glaciers have been melting for more than 150 years. This melting is consistent with increased solar radiation since the early 1700s. Solar activity has continued to increase over recent decades, albeit not steadily.

Weather and Climate There is no evidence of increased frequency of droughts, floods, tropical cyclones, middle latitude storms or other violent weather activity as Earth has warmed by about 0.6C during the 20th century. Claims that changes in frequency and magnitude will occur in the future are conjecture based largely on the output of rudimentary computer models.

Conclusion

We rely on the Sun for warmth, and water vapour (the principal greenhouse gas) ensures that we have a reasonably equable climate. The effect on climate of human-induced carbon dioxide emissions is negligible.

Yours sincerely,

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From 1986 to 1998 he headed Australia's National Climate
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