

## Chapter 6 – Recent Projections on Climate Catastrophe

We will continue in this chapter the work of Guy McPherson (Google ref. “Nature bats last”; <http://guymcpherson.com/climate-chaos>). In this chapter we bring attention again to recent forecasts.

### Large-scale assessments

Intergovernmental Panel on Climate Change (late 2007): >1.8 °C by 2100 (up to 4.5 °C, depending upon emissions scenarios).

Hadley Centre for Meteorological Research (late 2008): ~2 °C by 2100.

Later in 2008, Hadley Center’s head of climate change predictions Dr. Vicky Pope calls for a worst-case outcome of more than 5 °C by 2100. Joe Romm, writing for *Grist*, claims, “right now even Hadley [Centre] understands it [ $> 5\text{ °C}$ ] is better described as the ‘business-as-usual’ case.”

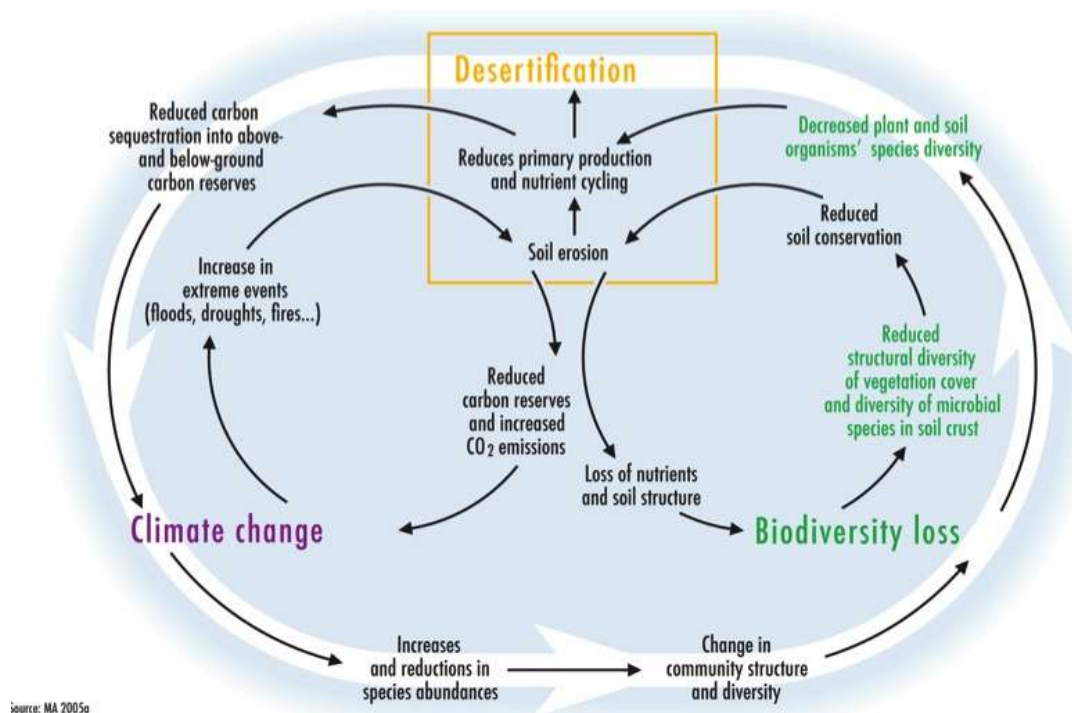
United Nations Environment Programme (mid 2009): 3.5 °C by 2100.

Hadley Centre for Meteorological Research (October 2009): 4 °C by 2060.

Global Carbon Project, Copenhagen Diagnosis (November 2009): 6 °C, 7 °C by 2100.

United Nations Environment Programme (December 2010): up to 5 °C by 2050.

These assessments fail to account for significant self-reinforcing feedback loops (i.e., positive feedbacks, the term that implies the opposite of its meaning).



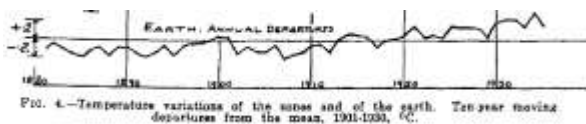
The IPCC’s self-praised Fifth Assessment continues the trend as it, too, ignores important feedbacks. As with prior reports, the Fifth Assessment “has been altered after the expert review stage, with changes added that downplay the economic impacts of a warming planet.”



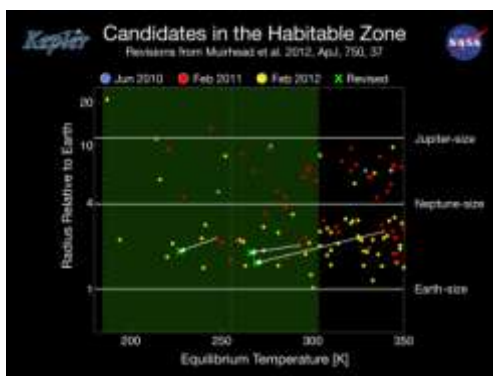
On a positive note, major assessments fail to account for economic collapse. However, due to the four-decade lag between emissions and temperature rise as well as the feedback loops described below, I strongly suspect it’s too late for economic collapse to extend the run of our species. Indeed, as pointed out by Bruce Melton at Truthout in a 26 December 2013 piece featuring climate scientist

Wallace Broecker: “today we are operating on atmospheric concentrations of greenhouse gases from the 1970s. In the last 29 years we have emitted as many greenhouse gases as we emitted in the previous 236 years. Because of the great cooling effect of the oceans, we have not yet begun to see the warming that this recent doubling of greenhouse gases will bring.”

The 40-year delay has been evident since at least 1938, when Guy Callendar pointed out the influence of rising carbon dioxide on temperature in a paper in the *Quarterly Journal of the Royal Meteorological Society*. The hand-drawn figure from the paper shown below clearly shows a rise in global-average temperature beginning about 1915, roughly 40 years after the consumption of fossil fuels increased substantially. Callendar’s work was used by J.S. Sawyer in a 1972 paper published in *Nature* to predict an “increase of 25% CO<sub>2</sub> expected by the end of the century ... [and] ... an increase of 0.6°C in the world temperature” with stunning accuracy.



### Taking a broad view



Astrophysicists have long believed Earth was near the center of the habitable zone for humans. Recent research published in the 10 March 2013 issue of *Astrophysical Journal* shows Earth is on the inner edge of the habitable zone, and lies within 1% of inhabitability (1.5 million km, or 5 times the distance from Earth to Earth’s moon). A minor change in Earth’s atmosphere removes human habitat. Unfortunately, we’ve started off major changes.

The northern hemisphere is particularly susceptible to accelerated heating, as explained in the 8 April 2013 issue of *Journal of Climate*. Two days later, a paper in *Nature* confirmed that summers in the northern hemisphere are hotter than they’ve been for 600 years. As pointed out by Sherwood and Huber in the 25 May 2012 issue of the *Proceedings of the National Academy of Sciences* and then by James Hansen in his 15 April 2013 paper, humans cannot survive a wet-bulb temperature of 35 °C.

As described by the United Nations Advisory Group on Greenhouse Gases in 1990, “Beyond 1 °C may elicit rapid, unpredictable and non-linear responses that could lead to extensive ecosystem damage”. James Hansen and crew finally caught up to the dire nature of 1 °C warming 23 years after the U.N. warning, 28 self-reinforcing feedback loops too late.

We’ve clearly triggered the types of positive feedbacks the United Nations warned about in 1990. Yet my colleagues and acquaintances think we can and will work our way out of this horrific mess with the tools of industrial civilization (which got us into this mess, as pointed out by Tim Garrett) or permaculture (which is not to defame permaculture, the principles of which can be implemented in nonindustrial farming).



Reforestation doesn’t come close to overcoming combustion of fossil fuels, as pointed out in the 30 May 2013 issue of *Nature Climate Change*. Furthermore, forested ecosystems do not absorb additional carbon dioxide as it increases in the atmosphere, as disappointingly explained in the 6 August 2013 issue of *New Phytologist*.



Adding outstandingly bad insult to spurting wound, the latest public-education initiative in the United States – the Next Generation Science Standards – buries the relationship between combustion of fossil fuels and planetary heating.

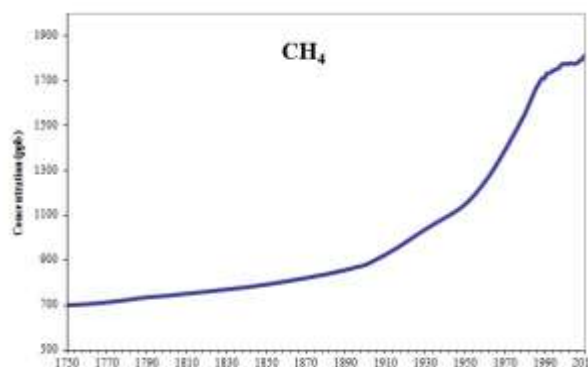
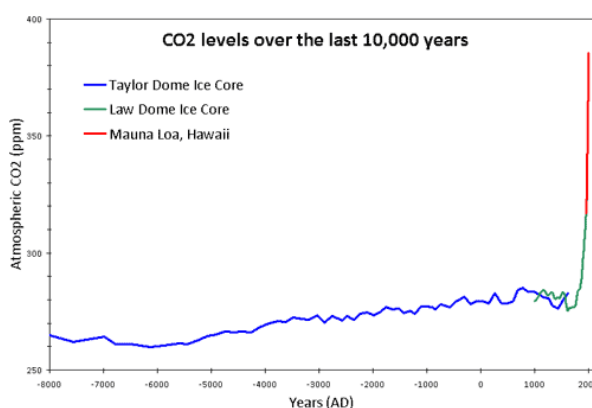


Some green-washing solutionistas take refuge in the nuclear solution. It’s astonishing what one can conclude when grid-tied electricity is viewed as a natural right. James Hansen’s approval notwithstanding, nuclear power plants cause, rather than prevent, additional warming of Earth.

Let’s ignore the models for a moment and consider only the results of a single briefing to the United Nations Conference of the Parties in Copenhagen (COP15). Regulars in this space will recall COP15 as the climate-change meetings thrown under the bus by the Obama administration. The summary for that long-forgotten briefing contains this statement:

THE LONG-TERM SEA LEVEL THAT CORRESPONDS TO CURRENT CO<sub>2</sub> CONCENTRATION IS ABOUT 23 METERS ABOVE TODAY’S LEVELS, AND THE TEMPERATURES WILL BE 6 °C OR MORE HIGHER. THESE ESTIMATES ARE BASED ON REAL LONG TERM CLIMATE RECORDS, NOT ON MODELS.

In other words, near-term extinction of humans was already guaranteed, to the knowledge of Obama and his administration (i.e., the Central Intelligence Agency, which runs the United States and controls presidential power). Even before the dire feedbacks were reported by the scientific community, the administration abandoned climate change as a significant issue because it knew we were done as early as 2009. Rather than shoulder the unenviable task of truth-teller, Obama did as his imperial higher-ups demanded: He lied about collapse, and he lied about climate change. And he still does.



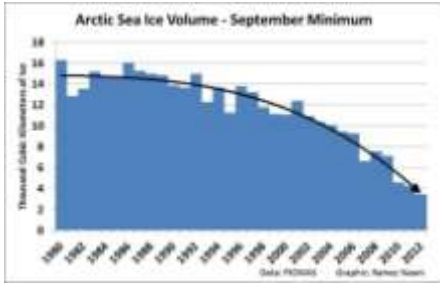
Ah, those were the days, when atmospheric carbon dioxide concentrations were well below 400 parts per million (ppm). We'll blow through the 400 ppm mark soon, probably for the first time in 3.2 to 5 million years. And, as reported in the journal *Global and Planetary Change* in April 2013, every molecule of atmospheric carbon dioxide since 1980 comes from human emissions. Not to be outdone, methane levels reached an average mean of 1800 parts per billion (ppb) on the morning of 16 June 2013. Tacking on a few of the additional greenhouse gases contributing to climate change and taking a conservative approach jacks up the carbon dioxide equivalent to 480 ppm. Seeps are appearing in numerous places off the eastern coast of the United States, leading to rapid destabilization of methane hydrates (according to the 25 October 2013 issue of *Nature*).

On land, man-made emissions of methane in the United States have been severely underestimated by the Environmental Protection (sic) Agency, according to a paper in the 25 November 2013 issue of *Proceedings of the National Academy of Sciences*. They state:

“Successful regulation of greenhouse gas emissions requires knowledge of current methane emission sources. Existing state regulations in California and Massachusetts require ~15% greenhouse gas emissions reductions from current levels by 2020. However, government estimates for total US methane emissions may be biased by 50%, and estimates of individual source sectors are even more uncertain. This study uses atmospheric methane observations to reduce this level of uncertainty. We find greenhouse gas emissions from agriculture and fossil fuel extraction and processing (i.e., oil and/or natural gas) are likely a factor of two or greater than cited in existing studies. Effective national and state greenhouse gas reduction strategies may be difficult to develop without appropriate estimates of methane emissions from these source sectors”.

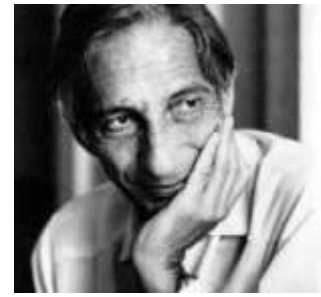
This figure is 1100 ppb higher than pre-industrial peak levels. Methane release tracks closely with temperature rise throughout Earth history — specifically, Arctic methane release and rapid global temperature rise are interlinked — including a temperature rise up to about 1 °C per year over a decade, according to data from ice cores.





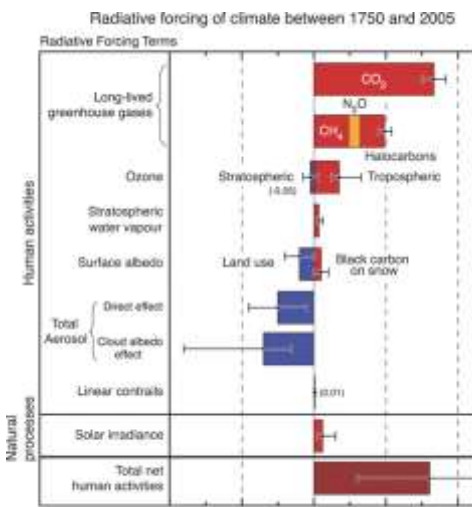
The tight linkage between Arctic heating and global heating was verified in an article in the 2 February 2014 issue *Nature Geoscience*, which found that the Arctic’s cap of cold, layered air plays a more important role in boosting polar warming than does its shrinking ice and snow cover. A layer of shallow, still air acts like a lid, keeping heat near the surface.

See how far we’ve come



Never mind that American naturalist George Perkins Marsh predicted man-made climate change as a result of burning fossil fuels in 1847. Never mind the warning issued by filmmaker Frank Capra in 1958 or the one issued by Austrian philosopher Ivan Illich in his 1973 article in *Le Monde*: “the impact of industrially packaged quanta of energy on the social environment tends to be degrading, exhausting, and enslaving, and these effects come into play even before those which threaten the pollution of the physical environment and the extinction of the (human) race.”

Never mind the 1986 warning from NASA’s Robert Watson of human extinction within a few decades as a result of climate change. Never mind that climate risks have been underestimated for the last 20 years, or that the IPCC’s efforts have failed miserably (David Wasdell’s scathing indictment of the vaunted Fifth Assessment is archived). After all, climate scientist Kevin Anderson tells us what I’ve known for years: politicians and the scientists writing official reports on climate change are lying, and we have less time than most people can imagine.



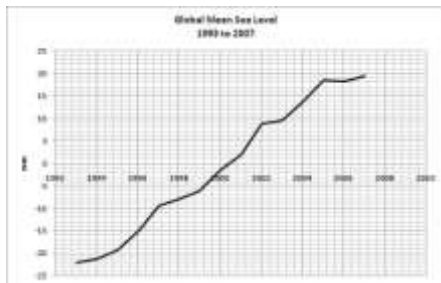
Never mind David Wasdell pointed out in 2008 that we must have a period of negative radiative forcing merely to end up with a stable, non-catastrophic climate system. Never mind that even the *Atlantic* is displaying “five charts about climate change that should have you very, very worried.” Never mind that atmospheric carbon dioxide is affecting satellites. Never mind that even the occasional economic analyst is telling climate scientists to be persuasive, be brave, and be arrested. Never mind that Peruvian ice requiring 1,600 years to accumulate has melted in the last 25 years, according to a paper in the 4 April 2013 issue of *Science*.

And never mind that summer warming in the interior of large continents in the northern hemisphere has outrun model predictions in racing to 6-7 °C since the last Glacial Maximum, according to a paper that tallies temperature rise in China's interior in the 15 May 2013 issue of the *Proceedings of the National Academy of Sciences*.



And finally, never mind that the IPCC's projections have been revealed as too conservative time after time, including low-balling the impact of emissions, as pointed out in the 9 March 2014 issue of *Nature Climate Change*. On 24 March 2014, renowned climate scientist Michael Mann commented on climate change as reported in the IPCC's Fifth Assessment: "It's not far-off in the future and it's not exotic creatures — it's us and now."

Never mind all that: Future temperatures likely will be at the higher end of the projected range because the forecasts are all too conservative and also because climate negotiations won't avert catastrophe.



Through late March 2013, global oceans have risen about ten millimeters per year during the last two years. This rate of rise is over three times the rate of sea level rise during the time of satellite-based observations from 1993 to the present. Ocean temperatures are rising, and have been impacting global fisheries for four decades, according to the 16 May 2013 issue of *Nature*.

Actually, catastrophe is already here, although it's not widely spread out in the United States, even though the continental U.S. experienced its highest temperature ever in 2012, shattering the 1998 record by a full degree Fahrenheit. But the east coast of North America experienced its hottest water temperatures all the way to the bottom of the ocean. The epic dust bowl of



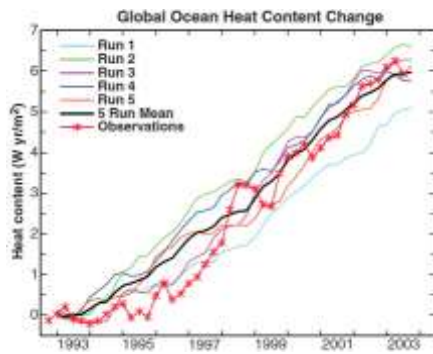
2012 grew and grew and grew all summer long. As pointed out in the March 2004 issue of *Geophysical Research Letters*, disappearing sea ice is expectedly contributing to the drying of the western United States (more definitive research on the topic appeared in the December 2005 issue of *Earth Interactions*). Equally expectedly, the drought arrived 40 years early.

Even James Hansen and Makiko Sato are asking whether the loss of ice on Greenland has gone exponential (while ridiculously calling for a carbon tax to "fix" the "problem"), and the tentative answer is not promising, based on very recent data, including a nearly five-fold increase in melting of Greenland's ice since the 1990s and a stunning melting of 98 percent of Greenland's ice surface between 8 and 15 July 2012. The mainstream media are finally taking notice, with the 18 July 2013 issue of *Washington Post* reporting the ninth highest April snow cover in the northern hemisphere giving way to the third lowest snow cover on record the following month (relevant records date to 1967, and the article is headlined, "Snow and Arctic sea ice extent plummet suddenly as globe bakes").

On a particularly dire note for humanity, climate change causes early death of five million people each year. Adding to our misery are interactions between various aspects of

environmental decay. For example, warming in the Arctic is causing the release of toxic chemicals long trapped in the region’s snow, ice, ocean and soil, according to research published in the 24 July 2011 issue of *Nature Climate Change*.

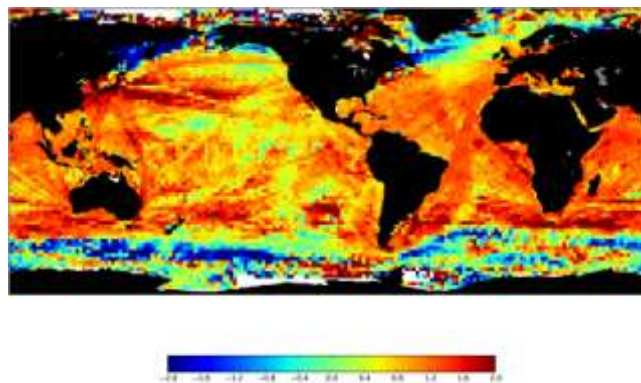
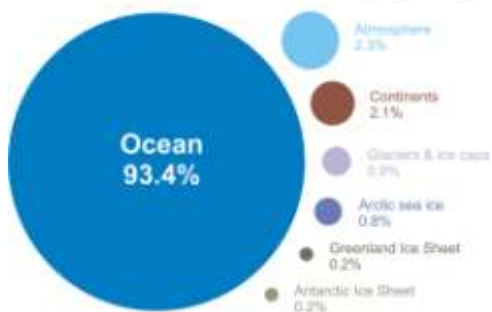
Greenhouse-gas emissions keep rising, and keep setting records. According to 10 June 2013 report by the International Energy Agency, the horrific trend continued in 2012, when carbon dioxide emissions set a record for the fifth year in a row. The trend puts disaster in the cross-hairs, with the ever-conservative International Energy Agency claiming we’re headed for a temperature in excess of 5 °C.



Completely contrary to the popular myth, global heating has accelerated, with more overall global heating in the 15 years up to March 2013 than the prior 15 years. This heating has resulted in about 90% of overall global heating going into warming the oceans, and the oceans have been warming dramatically, according to a paper published in the March 2013 issue of *Geophysical Research Letters*. Even *Slate* magazine figured it out by 5 November 2013, and *The Guardian*’s headline from 13 November 2013 announces, “Global warming since 1997 more than twice as fast as previously estimated, new study shows.”

About 30% of the ocean warming over the past decade has occurred in the deeper oceans below 700 meters, which is unprecedented over at least the past half century. According to a paper in the 1 November 2013 issue of *Science*, the rate of warming of the Pacific Ocean during the last 60 years is 15 times faster than at any time during the last 10,000 years. By the

### Where is global warming going?



end of 2013, the fourth-hottest year on record, the deep oceans were warming particularly rapidly and NASA and NOAA reported no pause in the long-term warming trend. “In 2013 ocean warming rapidly escalated, rising to a rate in excess of 12 Hiroshima bombs per second – over three times the recent trend.” When the heat going into the ocean begins to influence land-surface temperatures, “rapid warming is expected,” according to a paper published 9 February 2014 in *Nature Climate Change*. According to James Wight, writing for *Skeptical Science* on 12 March 2014, “Earth is gaining heat faster than ever.”

Coincident with profound ocean warming, the death spiral of Arctic sea ice is well under way.

In the category of myth busting comes recent research published in the August 2013 issue of *Proceedings of the National Academy of Sciences*. Contrary to the notion that changing solar





radiation is responsible for rising global temperature, the amount of solar radiation passing through Earth's atmosphere and reaching the ground globally peaked in the 1930s, substantially decreased from the 1940s to the 1970s, and changed little after that. Indeed, the current solar activity cycle is the weakest in a century. In addition, according to a paper in the 22 December 2013 issue of *Nature GeoScience*, climate change has not been strongly influenced by variations in heat from the sun.

Global loss of sea ice matches the trend in the Arctic. It's down, down, and down some more, with the five lowest values on record all happening in the last seven years (through 2012). As reported in a June 2013 issue of *Science*, the Antarctic's ice shelves are melting from below. When interviewed for the associated article in the 13 June 2013 issue of *National Geographic*, scientists expressed surprise at the rate of change. Colour me shocked. Three months later, the 13 September 2013 issue of *Science* contains another surprise for mainstream scientists: The Pine Island Glacier is melting from below as a result of warming seawater. And four months after that dire assessment, the massive glacier was melting irreversibly, according to a paper in the 12 January 2014 issue of *Nature Climate Change* (Robert Scribblers provides an overview of the latter phenomenon).

### *Then see where we're going*



during the decade 2001-2010, contributing to more than a 2,000 percent increase in heat-related deaths.



The climate situation is much worse than I've led you to believe, and is accelerating far more rapidly than accounted for by models. Even the U.S. Centers for Disease Control and Prevention acknowledges, in a press release dated 6 June 2013, potentially lethal heat waves on the near horizon. Piling on a month later, the World Meteorological Organization pointed out that Earth experienced unprecedented recorded climate extremes

during the decade 2001-2010, contributing to more than a 2,000 percent increase in heat-related deaths.

Although climate change's heat – not cold – is the real killer, according to research published in the December 2013 issue of the *Journal of Economic Literature*, swings in temperature may be even more lethal than high temperatures. Specifically, research published in the 29 January 2014 issue of the *Proceedings of the Royal Society of London* shows insects are particularly vulnerable to temperature swings.

Ice sheet loss continues to increase at both poles, and warming of the West Antarctic Ice Sheet is twice the earlier scientific estimate. Arctic ice at all-time low, half that of 1980, and the Arctic lost enough sea ice to cover Canada and Alaska in 2012 alone. In short, summer ice in the Arctic is nearly gone. Furthermore, the Arctic could well be free of ice by summer 2015, an event that last occurred some three million years ago, before the genus *Homo* walked the planet. Among the results of declining Arctic ice are extremes in cold weather in northern continents (thus illustrating why "climate change" is a better term than "global

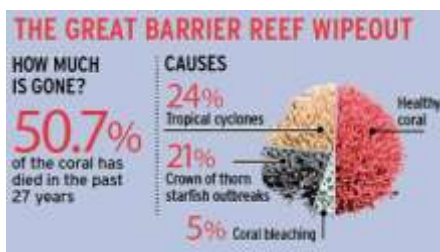


warming”). In a turn surprising only to mainstream climate scientists, Greenland ice is melting rapidly.

Even the conservative International Energy Agency (IEA) has thrown in the towel, concluding that “renewable” energy is not keeping up with the old, dirty standard sources. As a result, the IEA report dated 17 April 2013 indicates the development of low-carbon energy is progressing too slowly to limit global warming.

The Arctic isn’t Vegas — what happens in the Arctic doesn’t stay in the Arctic — it’s the planet’s air conditioner. In fact, as pointed out 10 June 2013 by research scientist Charles Miller of NASA’s Jet Propulsion Laboratory: “Climate change is already happening in the Arctic, faster than its ecosystems can adapt. Looking at the Arctic is like looking at the canary in the coal mine for the entire Earth system.” In addition, “average summer temperatures in the Canadian Arctic are now at the highest they’ve been for approaching 50,000 years” (and perhaps up to 120,000 years) according to a paper published online 23 October 2013 in *Geophysical Research Letters*. On the topic of rapidity of change, a paper in the August 2013 issue of *Ecology Letters* points out that rates of projected climate change dramatically exceed past rates of climatic niche evolution among vertebrate species. In other words, vertebrates cannot evolve or adapt rapidly enough to keep up with ongoing and projected changes in climate.

How critical is Arctic ice? Whereas nearly 80 calories are required to melt a gram of ice at 0 °C, adding 80 calories to the same gram of water at 0 °C increases its temperature to 80 °C. Anthropogenic greenhouse-gas emissions add more than 2.5 trillion calories to Earth’s surface every hour (ca. 3 watts per square meter, continuously).

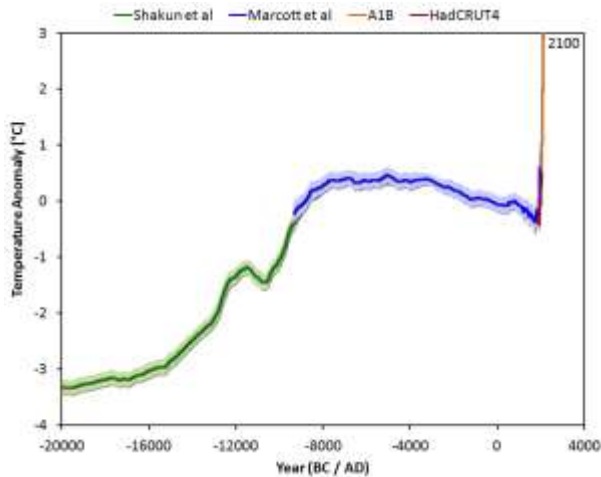


Ocean acidification associated with increased atmospheric carbon dioxide is proceeding at an unprecedented rate – the fastest in 300 million years – leading to great simplification of ecosystems, and capable of triggering mass extinction by itself. Already, half the Great Barrier Reef has died during the last three decades. As with many attributes, the Arctic

Ocean leads the way in acidification. Similarly to the long lag in temperature relative to increase greenhouse gas emissions, changes in ocean acidity lag far behind alterations in atmospheric carbon dioxide, as reported in the 21 February 2014 issue of *Environmental Research Letters*.

An increasing number of scientists agree that heating of 4 to 6 °C causes a dead planet. And, they go on to say, we’ll be there much sooner than most people realize. Earth-system scientist Clive Hamilton concludes in his April 2013 book *Earthmasters* that “without [atmospheric sulphates associated with industrial activity] ... Earth would be an extra 1.1 °C warmer.” In other words, collapse takes us directly to 2 °C within a matter of weeks. According to a paper in the 24 November 2013 issue of *Nature Climate Change*, warming of the planet will continue long after emissions cease. Several other academic scientists have concluded, in the refereed journal literature no less, that the 2 °C mark is essentially impossible (for example, see the review paper by Mark New and colleagues published in the 29 November 2010 issue of the *Philosophical Transactions of the Royal Society A*). The German Institute for International and Security Affairs concluded 2 June 2013 that a 2 °C rise in global-average temperature is no longer feasible (and Spiegel agrees, finally, in their 7 June 2013 issue),

while the ultra-conservative International Energy Agency concludes that, “coal will nearly overtake oil as the dominant energy source by 2017 ... without a major shift away from coal, average global temperatures could rise by 6 degrees Celsius by 2050, leading to devastating climate change.” At the 11:20 mark of this video, climate scientist Paul Beckwith indicates Earth could warm by 6 °C within a decade. If you think his view is extreme, consider (1) the 5 °C rise in global-average temperature 55 million years ago during a span of 13 years (reported in the 1 October 2013 issue of *Proceedings of the National Academy of Sciences*), and also (2) the reconstruction of regional and global temperature for the past 11,300 years published in *Science* in March 2013. One result is shown in the figure below.



It’s not merely scientists who know where we’re going. The Pentagon is bracing for public dissent over climate and energy shocks, as reported by Nafeez Ahmed in the 14 June 2013 issue of the *Guardian*. According to Ahmed’s article: “Top secret US National Security Agency (NSA) documents disclosed by the *Guardian* have shocked the world with revelations of a comprehensive US-based surveillance system with direct access to Facebook, Apple, Google, Microsoft and other tech giants. New Zealand court records suggest that data harvested by the NSA’s Prism system has been fed into the Five Eyes intelligence alliance whose members also include the UK, Canada, Australia and New Zealand.” In short, the “Pentagon knows that environmental, economic and other crises could provoke widespread public anger toward government and corporations” and is planning accordingly. Such “activity is linked to the last decade of US defence planning, which has been increasingly concerned by the risk of civil unrest at home triggered by catastrophic events linked to climate change, energy shocks or economic crisis — or all three.” The global police state has arrived.