

THE RETURN OF CLIMATE CHANGE

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It seems like a very far away era.

Governments were seriously considering the introduction of a carbon tax and they were providing generous incentives for renewable energy. Nicholas Stern, from the UK Treasury, was publishing *The Economics of Climate Change*. The IPCC and Al Gore were awarded the Nobel prize. Aspiring Prime Ministers could not do enough to show their green credentials - dog sledging in the Arctic being a favourite. The consequences of raising the Earth's temperature by 2 degrees were a topic of serious discussion, as was the tolerable level of ppm¹ of CO₂ in the atmosphere.

The Great Recession, which started in 2008 and continues to this day, changed all that. Exxon Mobil and friends played a role by investing in every possible challenge to the underlying science, but truthfully they have had it easy. We humans have shown our true face and have clearly indicated our complete aversion to using our taxpayers' money for some uncertain future benefits while economic growth for most people was beginning to be a mirage. Subsidies for renewables, though modest, were cut substantially². Environmentalists retreated to the obvious: energy efficiency, clean air and water, effective waste management, recycling. Global warming and climate change almost disappeared from public discourse except that the indisputable melting of the Arctic gave a glimpse of plenty new underwater resources.

¹ Parts per million

² But, interestingly, not those for fossil fuels

Recent findings and the extreme events connection

Of late, however, a number of recent studies might pave the way for a change in attitudes.

A recent paper by the *Berkeley Earth Surface Temperature (Best)*, which has used over 14 million observations from nearly 45,000 sites dating back to 1753, concluded that humans were almost completely responsible for the warming of 1.5° C of the land over the last 250 years. On the surface this looks like the non-finding of the century except that the study was funded also by climate sceptics and claimed at least one convert in prof. Richard Muller, a physicist and former sceptic. Yet a new research, however massive and rigorous, confirming what most scientists and the informed public already knew is unlikely to have substantive practical repercussions.

Of greater impact might be a study by the *American Meteorological Society*³, probably the first of its kind, where several extreme events in 2011 were considered, namely:

- The floods in Thailand
- The drought in Eastern Africa
- The Texas drought
- Remarkable European temperatures: warmest spring and autumn in France vs. record cold in the UK in December 2010
- Warm autumns (2009, 2011) and cold winters (09/10; 10/11) in Central England

The conclusions of the 21 scientists and researchers involved from 11 Universities and specialized institutions from 6 countries (USA, UK, Canada, Australia, France and Holland)⁴ are that, with the exception of the Thai floods, climate change appears to be at a minimum partly responsible for the extreme events analyzed. Climate change theory has been predicting it for quite a while. In this case, however, scientists were able to 'demonstrate' or at least strongly suggest a specific linkage. A recent paper by James Hansen⁵, a leading climate scientist, has examined the distribution of temperatures in June-July-August from 1951 to 2011. It clearly shows, when each decade is examined, that the mean temperature is increasing and that the days with temperatures over the lower limit for extreme heat to set in, are increasing in each decade. Today, at any time, extreme events can be found in 8% of the world. The causality for a heating world is not analyzed here,

³ Peterson, Stott and Herring (editors): *Explaining Extreme Events of 2011 from a Climate Perspective*, AMS 2012

⁴ NOAA (National Oceanic Atmospheric and Administration), US; University of California, Santa Barbara; Oregon State University; Met Office, UK; Oxford University; University of Edinburgh, UK; Environment Canada; University of Victoria, Canada; CSIRO, Australia; KNMI, Netherlands; CNMR/Meteo-France; LSCE/ISPL, France

⁵ *Perception of climate change*, Proceedings of the National Academy of Science, March 2012

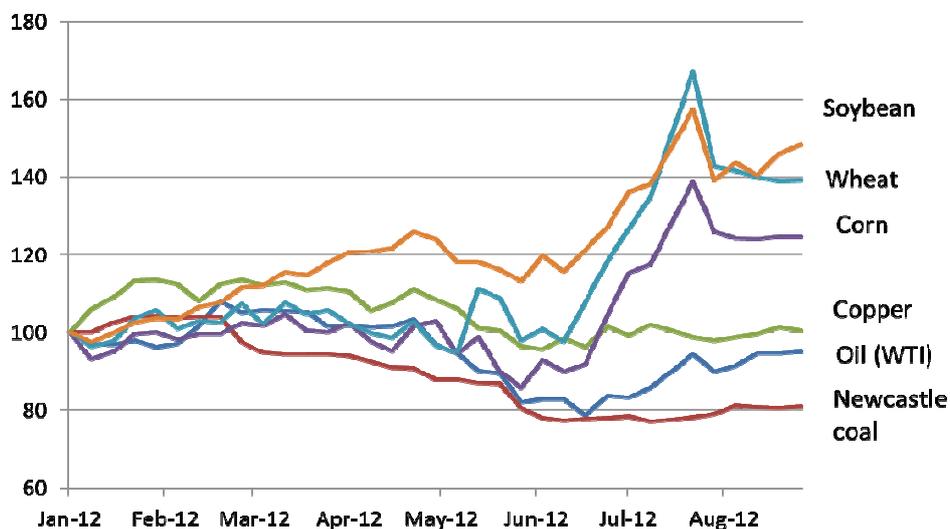
but the relationship between a hotter world and more extreme events is proven.

The 7 July issue of *The New Scientist* had the link between climate change and extreme weather as the main theme summarizing several recent studies, including those mentioned earlier. The telling caption was '*Our weather is not only becoming more extreme, it's becoming even more extreme than anyone expected*'.

Climate change and agriculture

For once the scientific evidence has gone hand in hand with current concerns and popular perception. The severe drought in the middle of the US in the summer of 2012 has dominated not just the agricultural and commodity worlds. It has moved the number of Americans believing climate change to be a reality from slightly over 50% to 70% in a few months. More to the point, it has raised climate change to the status of prime suspect in an event with potentially strong immediate economic consequences. We are no longer worrying primarily about the 'storms of our grandchildren'⁶. We are concerned with the sudden rise in the price of corn, soybeans and wheat and their relative scarcity! (Tab.1)

Table 1: Trend in commodity prices (2012)



Source: Bloomberg

To be fair the impact of climate change on agriculture has been the object of many studies in recent years. Examples:

- An analysis of the relations between climate trends and global crop production has been

⁶ James Hansen, *Storms of our grandchildren*, Bloomsbury 2009

published on *Science* in July 2011⁷. Like many such studies it is very detailed, analyzing key regions of the world, and the impact of temperature and precipitation changes in each. It concluded that yields of corn and wheat have fallen on average globally by 3 to 4% between 1980 and 2008, whereas those of rice and soybeans have increased. The study also showed that while yields in the US have been reasonably stable, they have reduced sharply for corn in China and Brazil and for wheat in Russia.

- In June of 2012 the much discussed *Environmental Protection Agency* (EPA)⁸ showed that while corn yields have been increasing thanks to technological advances, extreme weather events in specific years would cause dramatic albeit temporary reductions.
- *The food gap*, a 2011 report of the *Universal Ecological Fund*⁹ estimated that the impact of both changes in climate and water availability, and the concomitant population increase would lead by 2020 to a global deficit in wheat, rice and maize whereas soybean would show a surplus. The report includes very detailed projections by major country for each crop¹⁰.

These and other similar reports appear to have had a modest impact, possibly because they are hyper-technical, of limited scope and yield sometimes contradictory results. US farmers' attitudes this summer were best summed up by the Missouri farmer quoted in the FT: *'It's more God and nature dictates than a man made event'*¹¹. After all, so long as the insurers and the government pick up the tabs, why confuse the issue with man's interference? The problem is that insurers and government will face increasing costs and will have to take measures to reduce losses and payouts including lower benefits and increased premiums¹². The new scientific evidence might hopefully be channeled into studying preventative measures through more practical modeling.

⁷ Lobell (Stanford), Schlenker (Columbia) and Costa-Roberts (NBER), *Climate Trends and Global Crop Productions since 1980*, *Science*, July 2011

⁸ Made famous by Republican candidate Rick Perry, as an agency he would have abolished, but whose name he couldn't remember

⁹ *The Food Gap*, FEU-US, January 2011

¹⁰ The report also goes beyond the four crops and foresees a difficult time for grapes and olives in the Mediterranean and in California; a terrible outlook for Africa in general, but a positive one for Ethiopian coffee, just to quote some of the most peculiar findings

¹¹ FT: *Climate skepticism drenches drought-hit US Corn belt*, 16/8/12

¹² FT: *Insurers face huge losses on US crops*, 27/8/12

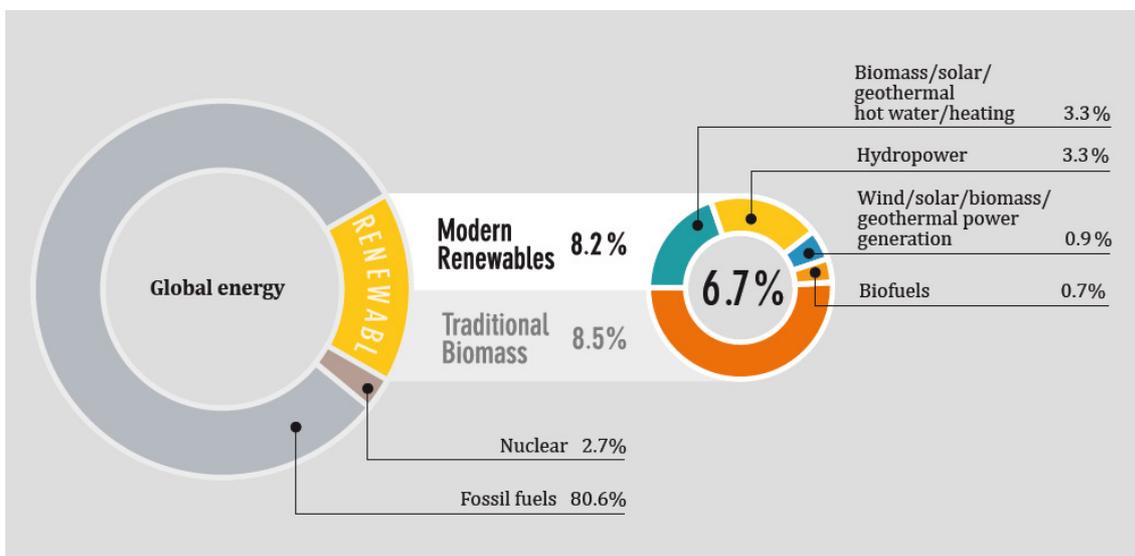
Possible impact

The recently established scientific link between specific extreme events and climate change however should at a minimum raise the level of attention paid to long term climate trends. In view of the fact that current efforts are unlikely to keep CO₂ levels below 350 ppm and hence future temperatures below an increase of 2° C, are we also likely to see a surge in the level of subsidies?

I very much doubt it. To start with, renewables are by now an established reality in the world of energy, and therefore viewed as requiring less help¹³:

- In 2010 total renewables accounted for 16.7% of energy consumption worldwide. True, half of it was the burning of traditional biomass but a solid 8.2% was attributable to 'modern' renewables, and that is more than 3 times the contribution of nuclear (Table 2). They account for over 20% of the world electricity production in 2011.

Table 2: Renewable energy share of global final energy consumption (2010)



Source: REN21, *Renewables 2012 Global Status Report*

- The yearly growth rate of renewables in 2006-11, when the world has been stalling, is very impressive: 58% for solar PV, 27% biodiesel, 26% wind. In 2011 investments in new renewable capacity (257 bln \$) were 17% higher than 2010 and 60% above 2009 levels.
- In the EU in 2010 ten countries (3 Scandinavian, 3 Baltic, Austria, Portugal, Slovenia and

¹³ The following information is taken by REN 21, *Renewables 2012 , Global Status Report*

Romania) had a renewable share of final energy of over 20%; leader Sweden exceeded 45%.

- The number of countries with specific policy targets for renewable energy and energy efficiency keeps growing and has now reached 118, while they were just 14 in the year 2000, to which one should add subnational entities such as US states, Canadian provinces and even cities which have their own targets.
- Manufacturing costs have gone down everywhere, most notably in solar PV.

Secondly, as the recession continues and the current majority view focuses on austerity and debt reduction, the witch-hunt for wasteful expenses will continue. The new scientific evidence and the increase in extreme weather will, if anything, help to resist attacks on continuing renewables' funding. But finding the political consensus to reduce CO₂ further is hard. As the search for growth and new jobs intensifies, all stigma is gone for fossils. Shale gas is viewed almost as environmental when it substitutes coal, since it has a much lower CO₂ per unit. Politicians can go further however, as is the case with Mitt Romney, who, as Massachusetts Governor wanted to close an aging coal fired plant because *'it kills people'*, but as a Presidential candidate is now fully behind coal development for achieving North American Energy independence¹⁴.

Moreover it is increasingly difficult to have a worldwide consensus on incentives for renewables and efficiency. Indeed treaties aimed at curbing global warming of the 'UN and EU variety' are unlikely to strengthen as almost thirty years of experimentation in this area have proven that bringing the world to agree to anything is next to impossible.

The perspectives are better for smaller agglomerates; after all the cities of Vaxjo in Sweden and Rajkot in India have their own targets of CO₂ reductions, as have the better known Madrid, San Francisco, Stockholm and Tokyo. Barcelona mandates 60% of solar hot water in all new buildings and major renovations, Adelaide operates public electric buses with 100% solar electricity and Boulder, Colorado, imposes a carbon tax on all fossil fuel electricity. A consensus may be achieved even at level of the individual nation-state including large ones. China is taking very seriously the climate change consequences, and so do Germany, the Scandinavian countries and Japan. The EU does its best to keep in line the unruly 27 with some impact and its carbon trading scheme will supposedly join in with the Australian one by 2015! Bringing the US in line appears implausible at this stage, but obviously not impossible.

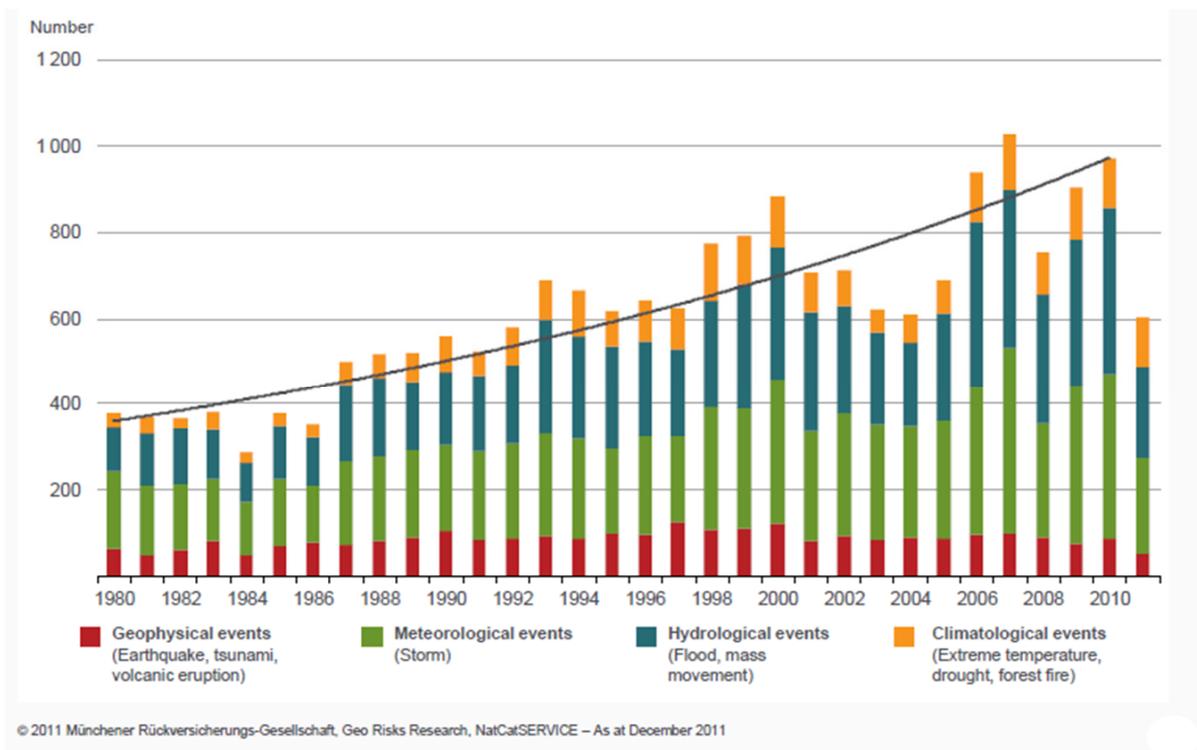
The more likely and gradual impact would be the broader acceptance of the basic tenets of climate

¹⁴ Bloomberg Brief, Clean Energy&Carbon, 28.8.2012

change science and consequently a greater propensity for drawing conclusions for individual businesses and funding specific impact studies and practical models helping to cope with climate changes. As we have seen agriculture is a primary target but it is not by any means the only domain.

Probably the one industry with more at stake is the insurance industry, which is most directly hit by extreme weather. It is not a surprise that the world's leading reinsurer, Munich Re, claims to have the world's largest database for catastrophes and extreme events (Table 3)¹⁵. It has pledged 2.5 bln \$ of its own funds to invest in renewables, it has supported many measures of climate mitigation and has adapted several policies to fit environmental needs.

**Table 3: Extreme weather events:
number of natural catastrophes worldwide 1980–2011***



(*) 2011 Jan. to Sept

Source: Munich RE

Another very interesting area is the melting of the Arctic ice which can lead to new transport routes, numerous possibilities for oil&gas explorations and mining and the opening up of new areas for agriculture. Hopefully we'll be able to avoid drastic consequences such as those hypothesized by Irvin Studin claiming that *'the melting of the polar ice signals the end of the Pax Arctica'*. By contrast one would expect studies by governments and private companies to multiply

¹⁵ *Weather extremes, climate change*, Durban 2011; 26/11/2011

to achieve a far more detailed understanding of the level of existing resources, the difficulties of getting at them, the timing of the melting which would allow arctic navigation routes to open. And there are many other areas: health, where species migration can be a major source of illnesses; fishing, as the oceans being among the entities most impacted by climate change; tourism and real estate.

A recent survey by Mercer, the second of its kind¹⁶, covering 42 institutional asset owners, primarily pension funds, and 51 asset managers, collectively totalling over \$ 12 trillion in 2011, showed that all asset managers and 57% of owners were assessing climate risks and opportunities and that the trend was upwards. How well, how deep, how seriously we do not know, but the survey hints that already now the largest financial corporations are taking the issue quite seriously in defining their policies.

The Great Recession had put climate change in the back burner, but the weather is forcing it on the front burner again. And we should count our blessing that solar sunspots appear to be on the low side and certainly inferior to the first half of the last century¹⁷; if and when that reverses, life could become quite difficult on Planet Earth! On balance the return of climate change as an issue - and as a source of jobs - is quite likely.

September 3rd 2012

¹⁶ Mercer, *Global Investor Survey On Climate Change*, July 2012

¹⁷ Sami Solawki, of Max Plank Institute for Solar System Research interviewed by BNEF (Bloomberg BNEF, Clean Energy&Carbon, 28/8/2012)