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A new science for a new climate

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Summary:
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At first glance it’s hard to imagine how the proliferation of human activity upon the environment has been a major factor in climate change given that climate change alone is nothing new. Over two million years the earth’s history has seen enormous changes. Indeed, in the last ten thousand years the warming and cooling of the earth has been on a larger scale that what we see today.

The climate is however very changeable these days. Getting the politics right has been half the fight. Unfortunately, the right policy has been held at bay partially by having the right knowledge of what’s happening to the climate. The climate changes we see today are the result of only a century and a half of study, peanuts in comparison the huge shifts over the earths history.

The recent UN Climate Change Conference sought to put in place a policy to take over the Kyoto protocol. At its core were some recently publicised results:

1. The warming trend on the earth’s surface has been taking place since the early part of the twentieth century. The last ten years have been the warmest of that millennium.

2. There have been rapid signs of melting the Arctic circle. The sea ice there has fallen by around eight percent over thirty years.

3. The old inconsistency in the data between the temperature rise in the

atmosphere and on the planets surface seems to have levelled out. They appear to rise in parallel.

4. The Scripps Institute of Oceanography in California noted that the ocean has been warming at different depths for over 65 years. These results match the predictions that warming has been induced more by greenhouse gases that as a result of small changes in the suns heat output.

5. There has been an observed and recorded link between the sea surface temperature and the frequency and intensity of tropical storms, typhoons and hurricanes.

6. The existing computer models of the change in ocean currents, in particular in the North Atlantic, are correct.

There are however still some unknowns. For example the solar hypothesis is now known to be a lesser contributor, the miniscule changes in the suns heat output over its eleven year sunspot cycle is adding to the mix. Also, the aerosol emissions from sulphurous fuel promote the formation of clouds, and as a consequence the sunlight reflected from the earths surface increases, effectively opposing the greenhouse gas effect.

Some even argue for the benefits of global warming, which include for example the opening up of new shipping lanes in the artic as the ice recedes, new oil drilling opportunities and longer harvest periods in Canada and Russia.

It seems climate change is inevitable and the small economic ideas such as banning coal subsidies bear little fruit as a means of curbing the problem. More than ever, political will must be demonstrated at first to show to industry and populations that it is even an issue. More importantly perhaps, the will of the politicians must be met with achievable methods from the technological and scientific community.

Professor Socolow is leading the way with what he calls “stabilisation wedges”. On a graph of climate change, the space between the trend line and the stability line is known as the “stabilisation triangle’. By dividing these triangles into wedges and assigning realistic goals to each wedge the massive problem is given a usable and effective solution.

The goals to assign to the wedges range from greater overall efficiencies, the decarbonisation of electricity, fuel displacement by low carbon electricity, methane management, and natural carbon sinks.

By further subdividing each wedge into sub wedges, such as decarbonised

electricity being subdivided into nuclear power, renewable energy, natural gas as an alternative to coal, and the storage of carbon dioxide – these problems are confounded into what everyone has been looking for. A short list of solutions that together will balance the problem.

It seems the technology for all this exists. It is merely in need of refinement. For example the management of carbon dioxide from the burning of fossil fuels could be dealt with through further carbon sequestration. A couple of power plants already employ this particular technique to good effect. The carbon dioxide is extracted at the source and is injected into porous rocks deep underground to prevent it escaping into the atmosphere.

Steam reformation is another technique. It is, in essence, a pre-emptive technique that reacts the fuel used with water to yield hydrogen. The hydrogen output is burnt to create electricity.

Of all the possibilities of reworking and inventing technologies, perhaps the best idea is the oldest idea. Replanting programmes. The idea of photosynthesis to combine carbon dioxide with water and sunlight is a relatively cheap and exponential idea and would be hugely effective.