

## ITER Forum News Log October 2010

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### .1.The Climate Science Isn't Settled

OPINION NOVEMBER 30, 2009, 7:44 P.M. ET

*Confident predictions of catastrophe are unwarranted.*

<http://online.wsj.com/article/SB10001424052748703939404574567423917025400.html>

By RICHARD S. LINDZEN

Is there a reason to be alarmed by the prospect of global warming? Consider that the measurement used, the globally averaged temperature anomaly (GATA), is always changing. Sometimes it goes up, sometimes down, and occasionally—such as for the last dozen years or so—it does little that can be discerned.

Claims that climate change is accelerating are bizarre. There is general support for the assertion that GATA has increased about 1.5 degrees Fahrenheit since the middle of the 19th century. The quality of the data is poor, though, and because the changes are small, it is easy to nudge such data a few tenths of a degree in any direction. Several of the emails from the University of East Anglia's Climate Research Unit (CRU) that have caused such a public ruckus dealt with how to do this so as to maximize apparent changes.

The general support for warming is based not so much on the quality of the data, but rather on the fact that there was a little ice age from about the 15th to the 19th century. Thus it is not surprising that temperatures should increase as we emerged from this episode. At the same time that we were emerging from the little ice age, the industrial era began, and this was accompanied by increasing emissions of greenhouse gases such as CO<sub>2</sub>, methane and nitrous oxide. CO<sub>2</sub> is the most prominent of these, and it is again generally accepted that it has increased by about 30%.

The defining characteristic of a greenhouse gas is that it is relatively transparent to visible light from the sun but can absorb portions of thermal radiation. In general, the earth balances the incoming solar radiation by emitting thermal radiation, and the presence of greenhouse substances inhibits cooling by thermal radiation and leads to some warming.

That said, the main greenhouse substances in the earth's atmosphere are water vapor and high clouds. Let's refer to these as major greenhouse substances to distinguish them from the anthropogenic minor substances. Even a doubling of CO<sub>2</sub> would only upset the original balance between incoming and outgoing radiation by about 2%. This is essentially what is called "climate forcing."

There is general agreement on the above findings. At this point there is no basis for alarm regardless of whether any relation between the observed warming and the observed increase in minor greenhouse gases can be established. Nevertheless, the most publicized claims of the U.N.'s Intergovernmental Panel on Climate Change (IPCC) deal exactly with whether any relation can be discerned. The failure of the attempts to link the two over the past 20 years bespeaks the weakness of any case for concern.

The IPCC's Scientific Assessments generally consist of about 1,000 pages of text. The Summary for Policymakers is 20 pages. It is, of course, impossible to accurately summarize the 1,000-page assessment in just 20 pages; at the very least, nuances and caveats have to be omitted. However, it has been my experience that even the summary is hardly ever looked at. Rather, the whole report tends to be characterized by a single iconic claim.

The main statement publicized after the last IPCC Scientific Assessment two years ago was that it was likely that most of the warming since 1957 (a point of anomalous cold) was due to man. This claim was based on the weak argument that the current models used by the IPCC couldn't reproduce the warming from about 1978 to 1998 without some forcing, and that the only forcing that they could think of was man. Even this argument assumes that these models adequately deal with natural internal variability—that is, such naturally occurring cycles as El Niño, the Pacific Decadal Oscillation, the Atlantic Multidecadal Oscillation, etc.

Yet articles from major modeling centers acknowledged that the failure of these models to anticipate the absence of warming for the past dozen years was due to the failure of these models to account for this natural internal variability. Thus even the basis for the weak IPCC argument for anthropogenic climate change was shown to be false.

Of course, none of the articles stressed this. Rather they emphasized that according to models modified to account for the natural internal variability, warming would resume—in 2009, 2013 and 2030, respectively.

But even if the IPCC's iconic statement were correct, it still would not be cause for alarm. After all we are still talking about tenths of a degree for over 75% of the climate forcing associated with a doubling of CO<sub>2</sub>. The potential (and only the potential) for alarm enters with the issue of climate sensitivity—which refers to the change that a doubling of CO<sub>2</sub> will produce in GATA. It is generally accepted that a doubling of CO<sub>2</sub> will only produce a change of about two degrees Fahrenheit if all else is held constant. This is unlikely to be much to worry about.

Yet current climate models predict much higher sensitivities. They do so because in these models, the main greenhouse substances (water vapor and clouds) act to amplify anything that CO<sub>2</sub> does. This is referred to as positive feedback. But as the IPCC notes, clouds continue to be a source of major uncertainty in current models. Since clouds and water vapor are intimately related, the IPCC claim that they are more confident about water vapor is quite implausible.

There is some evidence of a positive feedback effect for water vapor in cloud-free regions, but a major part of any water-vapor feedback would have to acknowledge that cloud-free areas are always changing, and this remains an unknown. At this point, few scientists would argue that the science is settled. In particular, the question remains as to whether water vapor and clouds have positive or negative feedbacks.

The notion that the earth's climate is dominated by positive feedbacks is intuitively implausible, and the history of the earth's climate offers some guidance on this matter. About 2.5 billion years ago, the sun was 20%-30% less bright than now (compare this with the 2% perturbation that a doubling of CO<sub>2</sub> would produce), and yet the evidence is that the oceans were unfrozen at the time, and that temperatures might not have been very different from today's. Carl Sagan in the 1970s referred to this as the "Early Faint Sun Paradox."

For more than 30 years there have been attempts to resolve the paradox with greenhouse gases. Some have suggested CO<sub>2</sub>—but the amount needed was thousands of times greater than present levels and incompatible with geological evidence. Methane also proved unlikely. It turns out that increased thin cirrus cloud coverage in the tropics readily resolves the paradox—but only if the clouds constitute a negative feedback. In present terms this means that they would diminish rather than enhance the impact of CO<sub>2</sub>.

There are quite a few papers in the literature that also point to the absence of positive feedbacks. The implied low sensitivity is entirely compatible with the small warming that has been observed. So how do models with high sensitivity manage to simulate the currently small response to a forcing that is almost as large as a doubling of CO<sub>2</sub>? Jeff Kiehl notes in a 2007 article from the National Center for Atmospheric Research, the models use another quantity that the IPCC lists as poorly known (namely

aerosols) to arbitrarily cancel as much greenhouse warming as needed to match the data, with each model choosing a different degree of cancellation according to the sensitivity of that model.

What does all this have to do with climate catastrophe? The answer brings us to a scandal that is, in my opinion, considerably greater than that implied in the hacked emails from the Climate Research Unit (though perhaps not as bad as their destruction of raw data): namely the suggestion that the very existence of warming or of the greenhouse effect is tantamount to catastrophe. This is the grossest of "bait and switch" scams. It is only such a scam that lends importance to the machinations in the emails designed to nudge temperatures a few tenths of a degree.

The notion that complex climate "catastrophes" are simply a matter of the response of a single number, GATA, to a single forcing, CO<sub>2</sub> (or solar forcing for that matter), represents a gigantic step backward in the science of climate. Many disasters associated with warming are simply normal occurrences whose existence is falsely claimed to be evidence of warming. And all these examples involve phenomena that are dependent on the confluence of many factors.

Our perceptions of nature are similarly dragged back centuries so that the normal occasional occurrences of open water in summer over the North Pole, droughts, floods, hurricanes, sea-level variations, etc. are all taken as omens, portending doom due to our sinful ways (as epitomized by our carbon footprint). All of these phenomena depend on the confluence of multiple factors as well.

Consider the following example. Suppose that I leave a box on the floor, and my wife trips on it, falling against my son, who is carrying a carton of eggs, which then fall and break. Our present approach to emissions would be analogous to deciding that the best way to prevent the breakage of eggs would be to outlaw leaving boxes on the floor. The chief difference is that in the case of atmospheric CO<sub>2</sub> and climate catastrophe, the chain of inference is longer and less plausible than in my example.

Mr. Lindzen is professor of meteorology at the Massachusetts Institute of Technology.

## 2. MIT Climatologist Richard Lindzen on the Politics of Global Warming

Sunday, 3rd October 2010

MIT's Richard Lindzen, one of the most-respected climatologists on the planet, speaks to the second annual International Conference on Climate Change in New York. Lindzen warns that scientists who embrace global warming alarmism are not necessarily good researchers. And that skeptics of global warming are not necessarily good researchers either. The point, he argues, is to stay focused on the facts as they can be determined and to follow the science, not the political debate.

## 3. Top science body cools on global warming

Graham Lloyd and Matthew Franklin From: *The Australian* October 02, 2010 12:00AM

<http://www.theaustralian.com.au/news/nation/top-science-body-cools-on-global-warming/story-e6frg6nf-1225933012675>

**THERE are gaps in scientific understanding making predicting the extent of climate change and sea level rises impossible.**

That's the claim of Britain's highest scientific authority, the Royal Society.

The society's revised Guide to the Science of Climate Change has been interpreted as a retreat from politics by an organisation regarded as the world's most authoritative scientific body following the scandal that engulfed the UN's Intergovernmental Panel on Climate Change.

The society's new guide does not dismiss climate change or the need for co-ordinated global action to combat it.

However, it undercuts many of the claims of looming ecological disaster that have been made in a bid to gain public support for political action.

The opposition seized on the Royal Society's shift to demand Julia Gillard accept that views on climate change differ.

Opposition climate spokesman Greg Hunt said: "This is a reminder on why Julia Gillard is wrong to vilify people who have the audacity to disagree with her views.

"We respect the right of individuals to make up their own minds based on their own assessments."

Climate Change Minister Greg Combet said the Royal Society's switch would not have any influence on the government's push to put a price on carbon.

"The government accepts the climate science," Mr Combet said.

"The debate has moved on.

"We must now get on with the job of reducing carbon pollution and reforming our economy."

The society's report was written by a panel of prominent scientists chaired by professor John Pethica.

The reworking was in response to pressure from 43 fellows who argued the society had gone too far.

Ian Plimer, professor of mining geology at Adelaide University, said the society's statement was a "wonderful breath of honesty and fresh air from an organisation that has been politicised".

"Science is always uncertain," Professor Plimer said.

"Science doesn't work by voting.

"It is not a democracy, it works on evidence."

Despite the uncertainties, the Royal Society concludes that there is strong evidence that changes in greenhouse gas concentrations due to human activity are the dominant cause of global warming over the past half-century.

"It is not possible to determine exactly how much the Earth will warm or exactly how the climate will change in the future, but careful estimates of potential changes and associated uncertainties have been made," Professor Plimer said.

"Uncertainty can work both ways, since the changes and their impacts may be either smaller or larger than those projected."

On sea level change, the society said it was likely that, for many centuries, the rate of global sea-level rise would be at least as large as the rate of 20cm per century that has been observed.

However, it said there was insufficient understanding of the melting of the ice sheets in Greenland and West Antarctica to predict how much the sea level will rise above that observed in the past century.

The society's cautious approach is in contrast to the UN's 2007 IPCC report.

The report said that "many millions more people are projected to be flooded every year due to sea-level rise by the 2080s".

Or predictions by former US president Al Gore in his documentary An Inconvenient Truth that the collapse of a major ice sheet in Greenland or West Antarctica could raise global sea levels by six metres, flooding coasts and creating 100 million refugees.

The Royal Society says the greatest gap in understanding is being able to accurately model clouds and their impact on reflecting heat.

The strength of the uptake of CO<sub>2</sub> by the land and oceans, which take up about half the emissions from human activity, is poorly understood, it says.

And there is little confidence in specific projections of future regional climate change, except at continental scales.

The Royal Society says that high-performance computers are expected to improve confidence in regional predictions.

There is also a possibility that unknown aspects of climate change could emerge and lead to significant

modifications in our understanding.

#### **4. Fusion Provides Answers**

<http://www.feastresearch.com.au/index.php/physics/fusion-provides-answers>

Last modified on Saturday, 04 September 2010 17:09

The confluence of rising CO<sub>2</sub> emissions with the recent oil crisis in the Gulf of Mexico is a poignant reminder of the damage our exploitation of fossil fuels are doing to our planet, both in their extraction and their combustion. Fossil fuels are only finite resources, and their cost will only rise over the long term.

Rather than focus the debate on managing dwindling fossil fuels, politicians of all flavours could simply accept there are no long term energy solutions, and look to social policy measures to modify behaviour, and global science quests to develop long term sustainable technological solutions.

On the policy side, we could implement a whole raft of measures: from increasing the rebate on hybrid cars to improving public transport and its utilisation, and encouraging the greater use of bicycles and indeed, our own two feet.

Increased energy research funding could target replacing our fossil economy, for example, by improving fuel cells efficiency and taming new sustainable energy sources such as fusion and solar to power a hydrogen economy.

One of these sustainable energy technology, fusion, is being "fast-tracked" by an international consortium of partners building the world's first "burning plasma" fusion experiment, ITER (International Thermonuclear Experimental Reactor), which is designed to test the scientific feasibility of fusion power.

Fusion is the process whereby lower atomic weight elements join to form a heavier element. This is the fundamental process that powers the Sun and the stars. Fusion energy promises millions of years of baseload energy generation, with almost no greenhouse gas emissions and no long-lived radioactive waste compared to coal and nuclear fission. Development of this energy technology requires committed multilateral programs, and ITER is the only viable global program to achieve this objective.

ITER is funded by a consortium comprising the EU, Japan, the USA, Russia, India, China and Korea. At a cost of US\$18 billion, ITER is also the world's largest science experiment. The host for the ITER experiment is the EU, with the host site in France.

Australia has an opportunity to engage in the ITER project through the construction of a targeted machine contribution, most likely a plasma diagnostic. This would realise objectives of the Australian science and engineering community in its 2007 strategic plan ([www.ainse.edu.au/fusion.html](http://www.ainse.edu.au/fusion.html)), and build on opportunities provided by the 2009 \$7m federal research infrastructure investment in the Australian Plasma Fusion Research Facility at the ANU. The major benefits to Australia from engagement with ITER include participation in the global development of a long-term energy solution, capability development in the research phase leading up to commercial realisation and engagement with world's largest science project. Wider benefits include fostering international research linkages, skills and training, supporting other power technologies (e.g. fission, solar) and the promotion of Australia's minerals and high-tech industry.

Participating in global efforts to find alternate solutions to fossil fuel won't plug the leak in the Gulf of Mexico, but it might eliminate the need of our species to drill in the first place.

Dr Matthew Hole, is an ARC Future Fellow from the Research School of Physical Sciences and Engineering at the ANU, and Chair of the Australian ITER Forum.

#### **5. RENEWABLE ENERGY**

<http://www.dennisjensen.com.au/viewStory/RENEWABLE+ENERGY>

Aug. 17, 2009

Dr Dennis JENSEN MP» (Federal member for Tangney) (7:10 PM) —I rise to support the Renewable Energy (Electricity) Amendment Bill 2009 and related bill, albeit with some small misgivings, which I will get on to a little bit later. Clearly, it is advisable to reduce our dependence on fossil fuels, not only due to the fact that they are non-renewable but also due to emissions of all sorts. This House will know that I am not particularly concerned about the carbon dioxide aspect; however, I am very concerned about sulphur dioxide, nitrous oxide and particulates, which are significant emissions from fossil fuel power stations and fossil fuels more generally. They clearly have significant adverse health effects.

My concern with this bill is that the way that renewables are viewed is fairly prescriptive and tight and that, in particular, issues such as substitution are inadequately addressed. For example, the member for Barker was talking about the potential for using wave power to directly desalinate water. This is a substitution for electricity but it is actually not included in the '20 per cent renewable' which is put forward in this bill. Additionally, we need to realise that there are problems associated with many, if not most, forms of renewable energy at present. For example, if significant portions of the electricity grid have wind generated power then you have grid instability. In fact, in 2006 all of Europe went down for half an hour. The half-hour blackout was the result of problems with a wind farm in Germany which, due to the total instability in the system, propagated through the system. Additionally, you cannot generate solar power when the sun does not shine. Proponents of these forms of electricity generation will argue that not only are these forms of generation capable of providing baseload power but they are capable of providing it economically, yet when you speak to many of these proponents privately they will acknowledge that they are not capable at present of providing baseload power and, in terms of the power supply more generally, in order to be economically viable they are reliant on government legislation which benefits their industry.

As well, one of my concerns is the issue of increased costs associated with the proportion of 20 per cent renewable for our electricity. It would be a very good idea to put an increased amount of research and development money into renewable energy. We need to be very careful about betting on winners, however. Historically, we have seen so many times with scientific advances that the winners are not where we perceive them to be. Indeed, in the 1950s there was a chance for Australia to get to the forefront of the solid-state electronics industry; however, the assessment in Australia at the time was that newfangled transistors and so on did not have a future and the world was going to be reliant on valves. You do not see too many valves made these days.

What about other generation methods? The current reality in the Australian context—and here I will ignore hydro because for both environmental and resource reasons more hydro in Australia is highly unlikely—is that the only methods at present that can generate baseload power are coal and gas. My question to members opposite is: an awful lot is being bet on geosequestration; what if geosequestration does not work as advertised? It has not been completely proved in terms of the entire system anywhere in the world, and all we need is something like a Lake Nyos situation with a burp of carbon dioxide killing multiple people. That sort of situation would very quickly put the geosequestration argument to bed. Can we be sure how stable that resource would be, given that we have drilled in there and formed a plug, if, for instance, you had an earthquake?

Given that, the only other low-carbon or no-carbon technology you have that is capable of generating baseload power is nuclear power. It is rather interesting that one of the methods of generating renewable power that is being considered and potentially could generate baseload power is hot-rock technology. The interesting point is that hot-rock technology is, in fact, nuclear technology; the reason those rocks are hot is the radioactive decay of uranium in those ores. It is interesting that the government will not consider nuclear power at all, particularly given their statement that this is the great moral and ethical imperative of our age. If it is such a great imperative, you would think that everything would be considered to reduce carbon dioxide emissions. But nuclear is not to be considered. If nuclear is so terrible and so dangerous, why are we exporting uranium? Isn't that gravely irresponsible?

Another thing we should be talking about is putting money into research and development. We need to look at putting money into generation IV reactors, which have significant advantages over conventional reactors because not only, in many cases, can those reactors use the uranium resource for 50 to 60 times longer than conventional reactors but they can also use depleted fuel from conventional reactors as the fuel for these reactors, and the waste form that you are left with is literally safe to handle with

your hands in a period of 300 years.

Another technology that we should invest in—and this would even be for people who are somewhat paranoid about fission power—is nuclear fusion. At present there is a great international program called ITER—it stands for International Thermonuclear Experimental Reactor—in France. It is one of the largest scientific projects in the world. In effect, it is a preproduction fusion prototype. This is a very clean energy resource, and I think it is foolhardy for Australia not to be involved at the ground level. If we are not one of the major program partners we should certainly be one of the subpartners in the project, because Australia is one of the world's energy superpowers in terms of nuclear energy, be it fission or fusion. You talk about uranium; you can talk about thorium and, indeed, about lithium. Western Australia has one of the largest resources of lithium in the world. We should be looking at becoming more energy independent, and getting involved in these sorts of areas would certainly make us more energy independent.

I will leave this debate by saying that if the government believes in the moral and ethical imperative that is reducing carbon emissions, they really should be considering nuclear energy. Certainly they should be investing in fusion energy even if they do not believe in fission energy. Having said that, I support this bill, albeit with the reservations that I have mentioned.

## 6. The future is fusion

By [Don Allan](#) - posted Tuesday, 7 September 2010

<http://www.onlineopinion.com.au/view.asp?article=10932>

If the IPCC scientists who predict CO<sub>2</sub> emissions cause climate change, and talk of the new technology being developed to combat it, never seem to mention nuclear fusion why should I be surprised that economist Professor Lord Stern, also famous for climate change predictions didn't mention fusion in his speech to the National Press Club last Wednesday?

During his speech Lord Stern alluded to new technology but not to fusion, nor did journalists raise the question at the end of his speech. Just in case they didn't ask because they were shy, let me mention it.

Fusion energy is limitless and waste free. But more to the point, when it becomes commercially viable not only will it solve nearly all of earth's energy problems, it will also combat CO<sub>2</sub> emissions and make redundant the wave energy, solar panel and windpower installations that currently pollute the landscape and will do so for years to come. However, geo-thermal energy will be useful.

## 7. Sustainable biochar to mitigate global climate change

Dominic Woolf, James E. Amonette, F. Alayne Street-Perrott, Johannes Lehmann & Stephen Joseph

<http://www.nature.com/ncomms/journal/v1/n5/full/ncomms1053.html>

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### Abstract

Production of biochar (the carbon (C)-rich solid formed by pyrolysis of biomass) and its storage in soils have been suggested as a means of abating climate change by sequestering carbon, while simultaneously providing energy and increasing crop yields. Substantial uncertainties exist, however, regarding the impact, capacity and sustainability of biochar at the global level. In this paper we estimate the maximum sustainable technical potential of biochar to mitigate climate change. Annual net emissions of carbon dioxide (CO<sub>2</sub>), methane and nitrous oxide could be reduced by a maximum of 1.8 Pg CO<sub>2</sub>-C equivalent (CO<sub>2</sub>-Ce) per year (12% of current anthropogenic CO<sub>2</sub>-Ce emissions; 1 Pg=1 Gt), and total net emissions over the course of a century by 130 Pg CO<sub>2</sub>-Ce, without endangering food security, habitat or soil conservation. Biochar has a larger climate-change mitigation potential than combustion of the same sustainably procured biomass for bioenergy, except when fertile

soils are amended while coal is the fuel being offset.

## 8. Julian Hunt: Stay local to beat global warming

The Independent on Sunday Commentators

<http://www.independent.co.uk/opinion/commentators/julian-hunt-stay-local-to-beat-global-warming-2043378.html>

**It is not hard to see why pessimism over climate change has been growing. But I believe we are reaching the point when the tide will decisively turn**

Thursday, 5 August 2010

Since the collapse of the landmark Copenhagen Summit last December, there has appeared to be setback after setback for those who, like me, believe climate change is the most serious problem facing mankind.

Most recently, the US Senate Majority Leader Harry Reid this week decided to withdraw a landmark cap-and-trade bill in recognition of its lack of support in the chamber. This effectively means that there will be no major US federal climate change initiative until at least after the 2012 presidential election.

This follows the confused misrepresentation of climate trends, especially by the Republicans and some British politicians, which appears to have sown further confusion among international publics about global warming complexity; this misunderstanding accounts, in part, for some global warming scepticism and indeed some of the confusion of "Climategate".

Meanwhile, evidence continues to mount that our planet is heating up, including the authoritative State of the Climate Report 2009 released this week by the US National Oceanic and Atmosphere Office (featuring data from the British Met Office). This shows, for the first time, multiple observational records from the top of the atmosphere to the depths of the ocean and concludes that "global warming is undeniable".

Given this backdrop, it is not hard to see why pessimism has grown this year about the future of international efforts to tackle climate change. However, far from this being the disaster that some assert, I believe that we are rapidly reaching the point when the tide will decisively turn. Why the reasons for such optimism amid so much apparent gloom?

First, there is now a much underappreciated movement towards the adoption of nuclear energy across the world. Despite the lack of recognition in the final Copenhagen communiqué, it is estimated by the International Atomic Agency that some 50 countries will have built nuclear reactors by 2030. This will result in a significant shift in the global energy mix and, while nuclear will continue to have vociferous critics, its virtue in the battle against climate change is as unquestionable as renewables such as wind and solar.

Second, in the absence of both a new global climate change deal to replace Kyoto, and more decisive national action by preponderant countries such as the United States, it is now much clearer than even a few months ago at Copenhagen that the centre of gravity of decision-making on how we respond to climate change must move towards the sub-national level, including to those many US cities which are leading the battle against global warming in North America.

The need for such a paradigm shift from a "top-down" to a "bottom-up" approach is becoming clearer by the day. For instance, over the last decade, while the earth's land and sea surface has been warming overall, trends of weather and climate records reveal larger and more unusual local variations – some unprecedented since the end of the last ice age 10,000 years ago. What these data patterns underline is that, while climate change is a reality, it is impacting regions and indeed sub-regions of the world in very different ways. More openness and clarity is needed about this huge complexity as it accounts, in part, for some global warming scepticism.

It is within this crucial context that sub-national governments across the world, including cities, are putting into practice the fact that adaptation needs to build on existing knowledge and infrastructures in local settings. Forming loose collaborative networks is enabling regional facilitation centres, their

experts and decision-makers to learn from one another and also draw upon the resources of existing national and international databases and programmes, such as those of the Intergovernmental Panel on Climate Change (IPCC) and the growing number of consortia linking major cities, local governments, and the private sector.

Experience shows that this bottom-up approach works very effectively as it is only generally when sub-national areas, such as cities, learn how they will be specifically affected by climate change that widespread, grassroots political action can be aroused.

I am therefore delighted at the increasing numbers of regional monitoring centres across the world, which are contributing towards local adaptation plans. In China, where provinces require targets for power station construction, regional environmental and climate change centres are now well developed. In the US, reports have highlighted the value of non-official centres, such as a severe storm centre in Oklahoma, which gives independent advice to communities and businesses, while relying on government programmes for much of the data. In Brazil, regional centres are providing data and predictions about agriculture and deforestation, and inform legislation about policy options.

What this activity points to is the need for a broader global network of such centres to support national climate initiatives, and to facilitate international funding and technical cooperation in delivering the right information to the right place at the right time.

Local actions can only be effective if measurements of climate and environment are made regularly and are publicised as well as information about targets, and projections of emissions. Experience shows that full exposure is needed about what is happening, what is planned, and how every individual can be involved (as the Danes show, for instance, by their community investment in wind power).

Taken overall, and despite recent setbacks such as the demise of the US cap-and-trade bill, I am therefore increasingly optimistic that the tide is turning decisively in favour of tackling climate change, but that it will be the cumulative effect of sub-national actions which will prove crucial in determining the speed and effectiveness of responses to climate change. While international and national policy will still have a key role to play, the message is nonetheless clear: "localisation of action and data" must and will increasingly be the priority in tackling the global warming menace.

*Lord Hunt is Visiting Professor at Delft University and former director-general of the UK Met Office*

## **9. Thorium a strong rival**

Robin Bromby From: [The Australian](#) October 07, 2010 5:27PM

<http://www.theaustralian.com.au/special-reports/climate-change/story-fn5oikwf-1225935583181>

### **Uranium may be tainted by politics, but an alternative has no such stigma**

BULGARIA is building a 1000 megawatt nuclear power station. Last month, Egypt announced it was opening international bidding for a 1200MW nuclear plant on its Mediterranean coast.

The connection between these two events -- apart from the fact that they are new nuclear plants -- is that the head office of the company providing the engineering expertise is based in North Sydney.

WorleyParsons has been involved in the design and construction of 18 nuclear generating plants and has a large nuclear branch in Sofia to work on such projects anywhere in the world. However, not in Australia.

Egypt plans to build four such plants by 2025, adding another 4000MW to the country's generating capacity, at breaking point in the hottest months of the year.

But, in Australia, nuclear power is a dead issue.

It was not featured in the recent federal election campaign, although other aspects of energy and climate were.

Yet while the Greens abhor it (and uranium mining), the British climate lobbyist Lord Stern told the National Press Club in Canberra last month that Australia should not rule out nuclear power while addressing the question of greenhouse gas emissions.

The use of nuclear power for power generation has grown worldwide. Even the German government, which had been planning to phase out its old nuclear plants, is now talking about extending their operating lives by a further 15 years.

So, too, has the case for nuclear being a very low greenhouse gas emitter.

But the ground is also changing, with new technologies possibly leading to a reassessment of nuclear as a clean and efficient form of electricity generation.

In a recent issue of the Washington-based journal *Science*, two British academics proposed that concerns about climate change, security of supply, and depleting fossil fuel reserves have spurred a revival of interest in nuclear power generation in Europe and North America, while other regions continue or initiate an expansion.

They argued this would be a two-staged process. Robin Grimes, materials researcher at Imperial College London and William Nuttall, senior lecturer in technology policy at the University of Cambridge, said the first stage would include replacing or extending the life of existing power plants.

But, from 2030, "a large-scale second period of construction would allow nuclear energy to contribute substantially to the decarbonisation of electricity generation".

And there would be ways to avoid expanding power grids. Grimes and Nuttall said that floating plants near large cities could be one such development, already a significant factor in developing countries that had inadequate national grid systems.

By 2030, too, it may be possible to use uranium as much as 15 times more efficiently, the authors said.

And there's an alternative to uranium - it's called thorium.

Its use for power generation is now being proposed by Nobel laureate Carlo Rubbia, of the European Organisation for Nuclear Research.

Rubbia was reported saying that a tonne of the silvery metal produces as much energy as 200 tonnes of uranium, or 3.5 million tonnes of coal.

Back in 2007, the House of Representatives industry and resources committee published a report much talked about at the time but quickly forgotten. It was called *Australia's Uranium: Greenhouse Friendly Fuel*.

Apart from recommending an end to bans on new uranium mines, the committee of six Coalition and three Labor MPs along with independent Bob Katter drew attention to the country's thorium capacity.

It reported that Australia then possessed the world's largest quantity of economically recoverable thorium resources, more than the US and Canada combined.

However, the committee report said the official figures for world thorium resources are considered conservative. Geoscience Australia had separately stressed that the Australian figure was based on assumptions rather than direct geological data. The parliamentary report noted that, like uranium, thorium can be used as a nuclear fuel (which is why the former West Australian Labor government banned mining of thorium as well as uranium) but, from an efficiency point of view, almost all the mineable thorium is usable in a reactor compared with only 0.7 per cent of natural uranium. "Thus, thorium may contain some 40 times the amount of energy per unit mass than uranium without recourse to fast breeders," the report continued.

Prescient - if ignored - words in light of the Rubbia comments.

But thorium also has another advantage for those worried about nuclear proliferation.

According to another scientist at the Geneva-based nuclear research organisation, it's difficult to make nuclear weapons using thorium because it emits too many gamma rays.

India is in the forefront of work on building thorium-fuelled reactors for generating electricity.

Last month the Brookings Institution in Washington D.C. released a paper on India's future issues with nuclear power.

It concluded that nuclear offered the country long-term energy security, but this entailed tapping into the

country's vast thorium resource, one of the biggest in the world and not far behind Australia's.

The problem identified by the Brookings paper is that India is forced to use uranium mined at grades as low as 0.1 per cent, making it two to three times more costly than uranium mined elsewhere.

Hence the appeal of thorium - using far less for the same output would constitute a significant cost saving. India is addressing the issue. But in Australia?

Silence.

## 10. Experts Meet for Largest Ever IAEA Fusion Conference

11 October 2010

<http://www.iaea.org/NewsCenter/News/2010/expertsmeet.html>

International Atomic Energy Agency

The ITER Tokamak will be nearly 30 metres tall, and weigh 23 000 tons. The Tokamak is a doughnut-shaped vessel surrounded by coils that produce an intense magnetic field — in which the conditions needed for fusion are created and maintained.

More than 1000 scientific experts meet this week, to discuss nuclear fusion as a source of energy. The gathering opened 11 October in Daejeon, the Republic of Korea.

The five-day 23rd biennial Fusion Energy Conference is organized by the IAEA and hosted by Korea's National Fusion Research Institute.

As the search for greener forms of electricity production intensifies, the pursuit of peaceful nuclear fusion has received growing attention in the scientific community.

This year's Fusion Energy Conference brings together the largest group of physicists working in the field to date.

"For the world at large, fusion energy remains a distant dream but the large group of distinguished scientists gathering in Daejeon recently made important headway to move the dream closer to reality," said Werner Burkart, Head of the IAEA's Nuclear Sciences and Applications Department, who opened the Conference on behalf of IAEA Director General Yukiya Amano.

See Story Resources for more information.

## 11. First do the research, then make deep carbon cuts

Bjorn Lomborg From: The Australian October 14, 2010 12:00AM

<http://www.theaustralian.com.au/news/opinion/first-do-the-research-then-make-deep-carbon-cuts/story-e6frg6zo-122593837258>

**CLIMATE committees across the world are mistakenly putting the cart before the horse.**

ADVOCATES of drastic cuts in carbon dioxide emissions now speak a lot less than they once did about climate change. Climate campaigners changed their approach after the collapse of the Copenhagen climate change summit last December, and the revelation of mistakes in the UN climate panel's work, as well as in response to growing public scepticism and declining interest.

Although some activists still rely on scare tactics - witness the launch of an advertisement depicting the bombing of anybody who is hesitant to embrace carbon cuts - many activists now spend more time highlighting the "benefits" of their policy prescription. They no longer dwell on impending climate doom but on the economic windfall that will result from embracing the "green" economy.

You can find examples all over the world, but one of the best is in my home country, Denmark, where a government-appointed committee of academics recently presented their suggestions for how the country could go it alone and become "fossil fuel-free" in 40 years. The goal is breathtaking: more than

80 per cent of Denmark's energy supply comes from fossil fuels, which are dramatically cheaper and more reliable than any green energy source.

I attended the committee's launch and was startled that Denmark's Climate Commission barely mentioned climate change. This omission is understandable since one country acting alone cannot do much to stop global warming. If Denmark were indeed to become 100 per cent fossil-free by 2050, and remain so for the rest of the century, the effect, by 2100, would be to delay the rise in average global temperature by just two weeks.

Instead of focusing on climate change, the Climate Commission hyped the benefits that Denmark would experience if it led the shift to green energy. Unfortunately, on inspection these benefits turn out to be illusory.

Being a pioneer is hardly a guarantee of riches. Germany led the world in putting up solar panels, funded by E47 billion (\$66bn) in subsidies. The lasting legacy is a massive bill and lots of inefficient solar technology sitting on rooftops throughout a cloudy country, delivering a trivial 0.1 per cent of its total energy supply.

Denmark itself has also already tried being a green-energy innovator; it led the world in embracing wind power. The results are hardly inspiring. Denmark's wind industry is almost completely dependent on taxpayer subsidies, and Danes pay the highest electricity rates of any industrialised nation. Several studies suggest that claims that one-fifth of Denmark's electricity demand is met by wind are an exaggeration, in part because much of the power is produced when there is no demand and must be sold to other countries.

The sorry state of wind and solar power shows the massive challenge that we face in trying to make today's technology competitive and efficient. Direct-current lines need to be constructed to carry solar and wind energy from sunny, windy areas to where most people live. Storage mechanisms need to be invented so that power is not interrupted whenever there is no sunshine or wind.

Proponents of carbon cuts argue that green-energy technologies only seem more expensive because the price of fossil fuels does not reflect the cost of their impact on the climate. But allowing for this would make little difference. The most comprehensive economic meta-study shows that total future climate impacts would justify a tax of around E0.01 per litre of petrol (\$0.06 per gallon in the US) an amount dwarfed by the taxes already imposed by most European countries.

Despite the fact changing from fossil fuels to green energy requires a total economic transformation, Denmark's Climate Commission claimed that the price tag would be next to nothing. The commission reached this conclusion by assuming that the cost of not embracing its recommended policy would be massive.

The commission believes that, during the next four decades, fossil-fuel costs will climb sharply because sources will dry up and governments will place massive taxes on fossil fuels. But this flies in the face of most evidence. There is clearly plenty of cheap coal for hundreds of years, and with new cracking technology, gas is becoming more abundant. Even oil supplies are likely to be significantly boosted by non-conventional sources such as tar sands.

By the same token, the prediction that governments will impose massive carbon taxes has little basis in reality. Such assumptions seem like a poor framework on which to build significant public policy and seem to ignore the substantial cost of eliminating fossil fuels, which is likely to amount to at least 5 per cent of gross domestic product a year.

The shift away from fossil fuels will not be easy. Policy-makers must prioritise investment in green-energy research and development. Trying to force carbon cuts instead of investing first in research puts the cart before the horse. Breakthroughs do not result automatically from a combination of taxes on fossil fuels and subsidies for present-day green energy: despite the massive outlays associated with the Kyoto Protocol, participating countries' investment in R&D as a percentage of GDP did not increase.

The change in message after the disaster of the Copenhagen summit was probably inevitable. But the real change that is needed is the realisation that drastic, early carbon cuts are a poor response to global warming no matter how they are packaged.

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## **12. No consensus among climate scientists after all**

Des Moore From: *The Australian* October 14, 2010 12:00AM 21 comments

<http://www.theaustralian.com.au/news/opinion/no-consensus-among-climate-scientists-after-all/story-e6frg6zo-1225938383591>

### **THE Royal Society's report coincides with dissidence at the American Physical Society.**

THE Royal Society's September report, *Climate Change: A Summary of the Science*, has brought into the open the widening difference of views about how the science of climate change should be assessed. It comes after a prominent resignation from the American Physical Society (the top body of US physicists) for the refusal of the society's executive to undertake a similar review despite requests from a large number of members.

In Australia, too, an examination of the Inter-Academy Council's review of the processes and procedures of the Intergovernmental Panel on Climate Change concludes that, although the council's chairman claims the IPCC's findings stand, the review itself exposes serious flaws in the panel's information and analysis. The examination by this group, which is a follow-up to its recent publication in the British journal *Energy & Environment*, is now being widely distributed in Australia.

All three assessments reflect the revelations provided by the exchanges between scientists actively involved in climate research - now known as *Climategate* - that some research results appear to have been falsified. These reports have spread widely in science circles in Australia. However, apart from *The Australian*, there has been almost no reference to these revelations in the Australian media. *The Age*, which had not bothered to cover the Royal Society's report, was quick to report that the Royal Society's vice-president John Pethica (who chaired the report committee) had rejected suggestions that the society had changed its position on climate change.

What Pethica said in responding to coverage in *The Australian* was: "There is no greater uncertainty about future temperature increases now than . . . previously indicated [and] the science remains the same, as do the uncertainties". He also refers to the report's conclusion that "There is strong evidence that changes in greenhouse gas concentrations due to human activity are the main cause of the global warming that has taken place over the past half-century".

What Pethica did not mention, however, is the report's statement that climate change "continues to be the subject of intensive scientific research and public debate" and that it divides the existing state of knowledge into three parts: science that is well established, where there is wide consensus but continuing debate, and where there remains substantial uncertainty. In fact it also states that "some uncertainties are unlikely ever to be significantly reduced". Beyond this, the report acknowledges "it is not possible to determine exactly how much the Earth will warm or exactly how the climate will change in the future".

Other important attitudinal changes reflected in the report include the absence of any explanations of why, despite CO<sub>2</sub> concentrations increasing over the course of the century, temperatures increased during only two periods: from 1910 to 1940 and from 1975 to about 2000; of why the report suggests projected increases in sea levels by 2100 that are lower than the upper estimate of the IPCC, 20cm compared with 59cm; and of why the report accords greater uncertainty to the causes of warming than does the IPCC in its 2007 report, where it is claimed as "very likely" due to human activity (which suggests a 90 per cent certainty). In fact, the Royal Society report offers no temperature ranges, no tipping point beyond which temperature increases are (supposedly) irreversible and (as noted) is uncertain about the possible extent of increases in temperatures.

Any careful reader of the report will acknowledge that it reflects the views of both sides of the debate on the science of climate change. Indeed, within the Royal Society a group of scientists during the past two years or so has been complaining to the executive that the society's claim of a consensus was untenable and contrary to science itself. The executive was eventually persuaded to undertake a review of the Royal Society's public position and representatives of the dissenting group were involved in the review.

Those representatives drew on exchanges with scientists in Australia and other parts of the world, and these are reflected in various parts of the report.

The challenge to the executive of the American Physical Society is to rescind its 2007 declaration that global warming represents "a dire international emergency". The large dissenting group there circulated a letter saying Climategate has revealed "an international fraud, the worst any of us have seen" and asking for the society's position to be put on ice until the extent of concern expressed at the Climategate revelations is clarified.

This dispute displays every sign of being ongoing.

With the increased problems with interpreting the science, it is not surprising that reports indicate the slow progress of climate change discussions in China and a dismal outlook for next month's international leaders' meeting at Cancun. This poses a serious risk that essential electricity investment here will not occur in time to prevent further precautionary price rises (on top of the already very large recent increases) and possible blackouts. In these circumstances, Australian governments need to provide a guarantee that investors in electricity generation will be compensated if generators or retailers are forced in the future to increase their prices because of carbon pricing policies. This is a matter that requires a decision at the Council of Australian Governments before the Gillard committee reports at the end of next year.

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