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1. German Chancellor Merkel on "mission fusion"

<http://www.iter.org/newsline/Pages/117/1688.aspx>

ITER Newsline #117

German Chancellor Angela Merkel wants more research into nuclear fusion. "Nuclear fusion is a form of energy that could provide an infinite amount of energy for us," said Merkel in her weekly video message broadcast last Saturday 30 January.

"Nuclear fusion could provide endless energy without producing radioactive waste," Merkel, a former physicist, said in the podcast. "It is worth investing in such a technology of the future, but no one country can do this alone. You need international scientific cooperation." She said that nuclear fusion, along with renewable energy sources such as wind and solar power, was a "future technology" worth investing in. The Chancellor added that scientific and technological research should be an economic priority as Germany recovers from recession. "Without research, without investment in the future, we will not be able to maintain our prosperity," she said.

Underlining her words, Merkel paid a visit on Monday to the Max-Planck-Institute for Plasma Physics in Greifswald. The Institute is the home of the stellarator project Wendelstein 7-X. In a press release commenting Merkel's visit to Greifswald, Thomas Bareiss, Member of the German Bundestag, underlined the Chancellor's commitment to fusion research. "To meet our long-term energy needs, we must continue to invest into fusion research. [...] It would be a serious mistake, to deprive ourselves from fusion as a means of safe, economic, environmental and climate-friendly and above all, inexhaustible energy."

2. Sceptic rubbishes computer modelling on climate change

Brendan O'Keefe

From: The Australian February 06, 2010 12:00AM

<http://www.theaustralian.com.au/news/sceptic-rubbishes-computer-modelling-on-climate-change/story-e6frg6xf-1225827285274>

Climatologists were downplaying the uncertainty of the long-term computer models used to predict climate change, a leading sceptic said yesterday, as repercussions spread from the mistaken IPCC claim that the Himalayan glaciers would melt by 2035.

Climate change sceptic William Kininmonth, a former director of the Bureau of Meteorology's National Climate Centre, questioned the reliability of long-term predictions, given that the limit of accurate forecasts was about 10 days.

"The whole issue about the global warming scenario is that the uncertainty of computer modelling is being downplayed," he said. "People are saying 'we know there are certain aspects of physics the system will respond to and that's what we'll go with', and not recognising the feedback process from weather systems that we just can't control."

Mr Kininmonth said the lead author of the Intergovernmental Panel on Climate Change's 2007 report, Michael Oppenheimer, who was questioned about the glacier mistake on ABC TV's 7.30 Report on Thursday, was hiding behind the excuse that there was a "fundamental uncertainty" in climate projections. Mr Kininmonth said: "Twenty years ago, at an early climate change convention, he was strongly supportive of anthropogenic global warming", based on modelling and forecasts made with crude computer systems that lacked data about ocean circulation. For Professor Oppenheimer now to cite uncertainty to defend mistakes in the IPCC report on glaciers was "disingenuous", Mr Kininmonth said. The flawed glacier claim found its way into a 2008 report by Australian government adviser Ross Garnaut.

UN Framework Convention on Climate Change executive Yvo de Boer has been forced to defend UN climate adviser Rajendra Pachauri against calls that he should resign. Dr Pachauri said calls for his resignation had come from fossil fuel companies. "This is an organised block of vested interests," he said.

Mr Kininmonth said the current El Nino weather system was a case in point on uncertainty. "If we can't predict short-term or seasonally, or the extent of an El Nino, how can we make predictions about what might happen 20, 30 or 100 years hence?" he said. "The best computer models are predictive for six to eight days -- that's the limit of our weather forecasting ability."

NCC climatologist and El Nino specialist Grant Beard said short-range and long-range forecasting were "two different problems" and uncertainty was a given beyond the short term. "You need to know very precisely the conditions of the atmosphere and ocean . . . but eventually you depart from reality after about 10 days," he said. "A forecast for 30 or 40 years in the future is not a forecast . . . we're just trying to get a gross measure of the global atmosphere and surface."

ADDITIONAL REPORTING: AFP

3. Uranium powers wasted

By John Phaceas, WA Business News
4-February-10

<http://www.wabusinessnews.com.au/login.php?url=http%3A%2F%2Fwww.wabusinessnews.com.au%2Fstory%2F1%2F78252%2FUranium-powers-wasted>

Embracing new generation nuclear generation technology is vital if Australia's vast reserves of uranium are not to be wasted, according to one of the world's leading nuclear energy research scientists.

4. A case for cooling it on warming

By Paul Murray | View Archive, The WestAustralian
4 February 2010, 12:23 pm

<http://au.news.yahoo.com/thewest/opinion/post/-/blog/paulmurray/post/441/comment/1/>

It almost creates a sense of nostalgia to see the time-honoured practice of verballing, so favoured by a generation of crooked coppers, back in vogue in Federal Parliament.

Prime Minister Kevin Rudd, completely wrong-footed on his emissions trading scheme by the collapse of the Copenhagen talks, has taken to attacking new adversary Tony Abbott over his use of the word "crap" in conjunction with climate change. "You cannot take the risk with Australia's future to have a leader (Mr Abbott) ... who goes out there and says climate change is absolute crap," is the line Mr Rudd has been pushing in recent days.

Now, Mr Rudd knows that isn't what Mr Abbott said because it was the Prime Minister's office that peddled around the Canberra press gallery in October last year a rural newspaper clipping quoting a speech Mr Abbott made to a group of Victorian farmers. "The argument (about climate change) is absolute crap," the newspaper quoted Mr Abbott saying. "However, the politics of this are tough for us. Eighty per cent of people believe climate change is a real and present danger."

It would be obvious to anyone even mildly literate that it is a different thing to say that an argument about something is crap rather than to say that the thing itself is crap. That is, unless you weren't trying to tell the truth in the first place.

Mr Rudd's office knows that the day Mr Abbott took on the Liberal leadership, he said this: "I think that climate change is real and that man does make a contribution." Of course, it hasn't seen the need to run that quote around the gallery.

The "argument" that Mr Abbott was referring to is the debate over the extent to which man-made emissions have contributed to global warming, the current perceived effects (like the now unravelling claims about melting glaciers and ice caps) and, more importantly, whether cutting emissions can reverse the process. Mr Abbott has now got himself into the climate change game with the Opposition's new direct action strategy which aims to match the Government's target of a 5 per cent cut to carbon emissions by 2020, albeit based on 1990 levels while Mr Rudd's ETS is on 2000 levels.

The raw politics of that is that the Opposition has to meet the 5 per cent target because the Government has now made it an international obligation that has to be met. There is one pertinent question both leaders need to face, but are curiously never asked: by how much will your 5 per cent cuts by 2020 slow increasing global temperatures? Neither man can truthfully say that theirs will have any effect at all.

So Mr Abbott, in chasing Mr Rudd down the slippery slope of global warming politics, has proved how right he was on the argument about climate change. It is crap. Why do something that will have no effect on the perceived problem? And even the argument that a 5 per cent cut is at least a start is crap. It is a start on a road that leads nowhere unless the rest of the world agrees to cuts way higher than that.

Until very recently, Mr Rudd thought he held such a moral imperative on the politics of climate change that he didn't need to answer any criticisms of his ETS. But now that his scheme is facing its third defeat in Parliament - and rapidly changing public acceptance - it appears he is prepared to argue his case. One of the first things he should do is to answer the charges made by Lord Christopher Monckton in an open letter to him early last month.

Lord Monckton, who is touring Australia punching holes in the Government's climate change rhetoric, made specific assertions about the effect on temperature change of the targets due to be adopted by the world's leading emitters from the Copenhagen talks. "Broadly speaking, the Annex 1 parties, who will account for about half of global emissions over the period, will commit to reducing current emissions by 30 per cent by 2020, or 15 per cent on average in the decade

between now and 2020," Lord Monckton said. "Thus, if every Annex 1 party to the Copenhagen Accord complies with its obligations to the full, today's emissions will be reduced by about half of that 15 per cent, namely 7.5 per cent, compared with business as usual. If the trend of the past decade continues, with business as usual we shall add 2 parts per million by volume/year, or 20 ppmv over the decade. Now, 7.5 per cent of 20 ppmv is 1.5 ppmv. One-fiftieth of a Celsius degree of warming forestalled is all that complete, global compliance with the Copenhagen Accord for an entire decade would achieve."

Yet the cost of achieving this result - an outcome so small that our instruments would not be able to measure it - would run into trillions of dollars. Now, 30 per cent is even beyond the upper-end target of the Rudd Government. It is offering only 5 per cent now with the possibility of increases to 15 or 25 per cent depending on international action. You do the maths on the effect of that tiny cut to our 1.5 per cent of global emissions.

Cutting atmospheric pollution is never a bad thing, especially if it doesn't entail an over-complicated system of trading permits that even on its own modelling causes huge fluctuations in the carbon price and would damage our international competitiveness if not matched by our trading partners and competitors. But trying to fool Australians that cuts to carbon emissions of 5 per cent - even 30 per cent - will have any real effect on global warming is just dishonest.

Australians are concerned about the implications of climate change. Cynical politicians, on both sides, do them no favours by merely trying to turn those fears to their electoral advantage. Both sides of politics need to think hard about Lord Monckton's final words in his open letter to Mr Rudd. He argues that waiting and adapting will be more cost-effective than trying to change how the atmosphere works: "It would be kinder to your working people to wait another decade and see whether global temperatures even begin to respond as the IPCC has predicted. What is the worst that can happen if you wait? Just 0.02C of global warming that would not otherwise have occurred. It's a no-brainer."

5. CLIMATE change policy just got a whole lot harder. Once again, the culprit is the science.

By Gary Johns, The Australian February 04, 2010 12:00AM 30 comments

<http://www.theaustralian.com.au/news/opinion/dont-count-your-trees-forests-arent-that-green/story-e6frg6zo-1225826508034>

New research suggests that forests are not the carbon sinks they were assumed to be.

Climate change policy-makers will have to return to the drawing board.

In late 2008, while he was a Smithsonian fellow, Griffith University associate professor Peter Pollard, a chemical engineer and water quality specialist, spent six months in one of the world's most isolated tropical jungles on Panama's Barro Colorado Island, and in the protected temperate boreal forests of Massachusetts.

In Panama, sitting atop a rudely constructed tower, he measured carbon dioxide and later, steering his tinny alongside the giant ships that pass through the Panama Canal, he measured the rate at which freshwater microbes use dissolved oxygen to generate carbon dioxide. His task was to test whether rainforests really store greenhouse gases endlessly. The working assumption was that more carbon appears to enter forests than leaves the forests.

The assumption that unaccounted for carbon dioxide in tropical and temperate forests is held by trees was proved wrong. Pollard found that water-based microbes return carbon dioxide to the atmosphere in large amounts. The implications of this research for climate change policy are huge. As Pollard states in his report to his sponsor, the Queensland government, "evidence is building to suggest that our forests do not store as much carbon as we thought. They may not be

the climate change 'get out of jail free' card we all want."

Where does this research leave the federal government and the opposition on climate change policy? The Coalition's direct-action policy commits it, among other things, to the planting of an additional 20 million trees by 2020 (former Labor prime minister Bob Hawke promised a billion in 1989) to re-establish urban forests and green corridors, presumably for the carbon-sink attributes as much as for any aesthetic purpose. The federal government's emissions trading scheme relies on a large number of carbon emission permits being purchased from Third World nations to save rainforests. If neither policy does the job it was meant to do, will the parties have to start again?

To the Greens this news will reinforce their view that carbon has to be stopped at the source, by closing coal-fired power stations. To the climate sceptics this news will reinforce their view that the science is such a movable feast that it is best to wait and get some hard evidence of human-induced climate change before taking any action. Third World countries with forests that see climate change as a way to freshen up the aid milch cow will be unhappy.

And what will the public think? The public will be looking for a way out of something that is far too complex and for which they know, especially following the failure of Copenhagen, political leaders have no answers. The political prize will be awarded to the party that relieves them of their dilemma -- concern over climate change -- even though there are no solutions to the apparent problem.

Climate change has now peaked as an issue; the politics are just too hard. There is no feasible policy option available that will lower Earth's temperature. The real options are to prepare for adaptation, should it prove necessary, and invest in less carbon-emitting power sources, but not bring these online unless and until they are cheap. To bring these online now would create hardship, the worst outcome for adaptation. Climate change will not be the vote-winner Labor had hoped for. It worked in 2007, when climate romance abounded and signing the Kyoto Protocol was free. That ruse cannot be repeated. Now both parties have minimal targets, a 5 per cent reduction in carbon dioxide by 2020, using 2000 as a base.

With an increasing population and no replacement of any coal-fired power station slated, that is not going to happen. The public has to grow up really quickly on this one, but the major parties are reluctant to raise the white flag and admit there is no solution. Intriguingly, the opposition has promised to establish forums to further debate climate change policy. This sounds like the path to reposition the electorate to the only game in town on climate change: adaptation and investment in energy technology research and development.

The further debate will have to debunk the old adage that delaying change will be more costly. This adage is just plain wrong. New technologies will not be adopted unless they are cheaper than current technologies. The reason why politicians subsidise the most expensive low carbon options, like wind turbines and solar panels, is that people mistake low carbon for low cost abatement. Also, these boutique non-solutions are not a huge budget cost (just a considerable waste of money). Sure, there is a risk to the environment in waiting for the technology to catch up, but that won't change the minds of several billion Chinese, Indians, Indonesians and South Americans. These people are not in the same game as the West, they want to lift their standard of living, and they will not be assisting in carbon abatement.

If in future historians of public policy dig through the entrails of climate change they will find a fascinating combination of millenarianism, ego-driven scientists, business that preferred to use the environment as a sales device, a propensity by governments to allow NGOs to get too close to the policy process, a media that mistook stunts for debate, lying former politicians, and current politicians who wanted to ride the hero's wave, retiring before their purported policies bore no fruit.

There is good science and there is good economics, they each need time to guide the way. The job of the politician in this debate is to buy time.

Gary Johns was a minister in the Keating government.

6. Tony Abbott's compost idea is not so corny

By Drew Warne-Smith and Asa Wahlquist, The Australian
February 04, 2010 12:00AM

<http://www.theaustralian.com.au/news/nation/tony-abbotts-compost-idea-is-not-so-corny/story-e6frg6nf-1225826533436>

It wasn't fear of global warming that prompted farmer Cam McKellar to start producing a humified compost that captures and stores carbon in his soil. Rather, it was a simple business decision. "It's about increasing the fertility of the soil, improving yields and producing better-quality food," says Mr McKellar, who runs a 1200ha corn and mixed-crop farm at Spring Ridge, 100km southwest of Tamworth in northeast NSW. "About 10 years ago we just hit a brick wall. Our production was going down, we were getting disease, so we had to take a big look at ourselves and overhaul the whole operation."

But if the 51-year-old veteran crop farmer is not motivated by cutting carbon emissions per se, he believes Tony Abbott is on the right track in announcing a \$1 billion fund to subsidise carbon-cutting practices such as soil carbon storage and tree planting. While Mr McKellar now undertakes biological farming - using a humified compost to capture and store carbon in the soil, and shunning acid fertilisers and pesticides - others are looking to alternative techniques such as biochar to lift soil carbon levels.

Biochar is a type of charcoal produced by heating natural organic materials such as crop waste and wood chip, which is returned to the soil. Depending on its feedstock, biochar is between 30 and 80 per cent carbon, in a form that can remain stable for perhaps a thousand years. The practice has the backing of a growing roster of green heavy-hitters, including Nobel Peace Prize winner Al Gore. James Lovelock, the influential British environmentalist, supports its use if limited to plant matter that would otherwise be left to decay. Several firms in the US and Europe are currently testing prototypes, and the technology is also being widely researched and tested in Australia.

Lukas Van Zwieten, a principal research scientist with Industry and Investment NSW, says the advantage with biochar is that the exact amount of carbon in it can be quantified. More than 200 field trials in Australia are being run with different types of biochars, on different crops and on different soils. "In some cases we are seeing some very, very positive results," Dr Van Zwieten said. We have had a doubling in biomass production in corn yield, but that is in one specific soil with one specific type of biochar, and that cannot be automatically translated to all biochars in all situations."

Most Australian soils are very low in carbon. Carbon can be increased by a range of changed farm practices, including switching from ploughing to no-till cropping, and retaining crop stubble. When Australia ratified the Kyoto Protocol, it did not sign up to soil carbon because that category included both man-made and natural changes. Bushfire and drought can severely reduce soil carbon, and the Australian government was worried a dry year or a big bushfire year could result in a carbon liability.

Greg Butler, from the South Australian No-Till Farmers' Association, said increased carbon brings on-farm benefits, including increased productivity and better capture of rainfall. But he also cautioned that selling soil carbon left farmers with a "custodial risk". If the carbon paid for decreased, the farmer became financially liable. "Soil carbon is living, fairly volatile carbon," Mr Butler said. It is a food source. But biochar is inert. That doesn't come with any of the custodial problems,"

Peter Cosier, from the Wentworth Group of Concerned Scientists, yesterday welcomed the Coalition's commitment to increasing carbon stored in Australian soil and vegetation. "The whole issue of using landscapes to help us with climate change and get multiple benefits is now a mainstream public debate," he said.

"Six months ago, we were struggling to get people to take notice of this issue at all." Back then, the group released a report stating that Australia could store an additional 1000 million tonnes of

CO2 equivalent in soils and vegetation each year. Mr Cosier said it is possible for Australia to cut carbon emissions by 5 per cent by 2020 from storing carbon in vegetation and soils. He would also like to see a targeted program of planting trees on degraded land, and the inclusion of biochar. Mr Cosier said that while biochar "is not part of the international rules", Australia should consider adopting the technology as one of many measures capable of reducing carbon dioxide emissions."

Johannes Lehmann, professor of soil fertility management at Cornell University, New York, said it had the potential to remove "a few billion tonnes" of carbon from the atmosphere a year. "This could be one of the top 10 solutions to climate change," he said. "It would be irresponsible to not probe its possibilities."

Additional reporting: The Sunday Times

7. Lack of Australian nuclear plant almost immoral: Peter Cosgrove

By Amanda O'Brien, The Australian
February 04, 2010 12:00AM

<http://www.theaustralian.com.au/business/mining-energy/lack-of-australian-nuclear-plant-almost-immoral-cosgrove/story-e6frg9df-1225826518848>

FORMER defence force chief Peter Cosgrove has pleaded for Australia to embrace nuclear power, criticising the "daily scrapping" between politicians about climate change.

Addressing a business breakfast in Perth, General Cosgrove said strong action was crucial and it was "almost immoral" to export uranium to less technologically advanced and stable countries to use in nuclear power plants while refusing to have one in Australia. "We'll give you the stuff but we won't use it ourselves; I find that difficult to comprehend," he said. "We're a rich and technologically advanced nation sitting in a geologically stable continent, so surely we can expect to build and operate safely a nuclear power station."

The former Australian of the Year said he anticipated there would be an outcry but there was no cleaner energy source than nuclear power. General Cosgrove declined to give a preference for either Kevin Rudd or Tony Abbott's climate change plans and instead expressed concern the election could dilute their political will. "The government of the day and the opposition are extraordinarily sensitive to the forthcoming federal election," he said. "The prism of the election and the need to retain or gain government starts to flavour agenda and actions. The will gets eroded and the intent gets blurred."

He conceded action to combat climate change would be costly and there were no guarantees about the outcome. "I really don't know if all I have been told is true and if we may be at risk of quite catastrophic climate change outcomes during the life of grandkids . . . but I am very uneasy about dicing with their future," he said. "If at the end of 50 years the last sceptic leaps to his feet on his zimmer frame and says 'I told you so' - and we've spent all this money for no great effect - then think of the obverse. Think of the people of Tuvalu now settling into Marrickville, Sydney . . . because their beautiful island is gone."

General Cosgrove suggested a national climate change commission should be established with its own charter and statutory powers to ensure strong and continuous change. "We can't have governments and oppositions daily scrapping over the concerted action we need to take across the national community. We need to start action now to avoid the climate change noose," he said. General Cosgrove pulled no punches in his speech to the breakfast at the University of Western Australia, which was hosted by major coal producer BHP Billiton. "If there wasn't a climate change issue then we could burn our coal till the cows come home and we wouldn't need to consider that large step to nuclear energy," he said. "But if we continue to burn our coal prolifically, then it seems to me we haven't taken climate change seriously."

8. Levitating magnet brings space physics to fusion

Tests on a machine that mimics a planet's magnetic field show that it may offer an 'alternative path' to taming nuclear fusion for power generation.

By David L. Chandler, MIT News Office
January 25, 2010

<http://web.mit.edu/newsoffice/2010/fusion-ldx-0125.html>

A new experiment that reproduces the magnetic fields of the Earth and other planets has yielded its first significant results. The findings confirm that its unique approach has some potential to be developed as a new way of creating a power-producing plant based on nuclear fusion — the process that generates the sun's prodigious output of energy.

Fusion has been a cherished goal of physicists and energy researchers for more than 50 years. That's because it offers the possibility of nearly endless supplies of energy with no carbon emissions and far less radioactive waste than that produced by today's nuclear plants, which are based on fission, the splitting of atoms (the opposite of fusion, which involves fusing two atoms together). But developing a fusion reactor that produces a net output of energy has proved to be more challenging than initially thought.

The new results come from an experimental fusion reactor at the Plasma Science and Fusion Center on the MIT campus, inspired by observations from space made by satellites. Called the Levitated Dipole Experiment, or LDX, a joint project of MIT and Columbia University, it uses a half-ton donut-shaped magnet about the size and shape of a large truck tire, made of superconducting wire coiled inside a stainless steel vessel. This magnet is suspended by a powerful electromagnetic field, and is used to control the motion of the 10-million-degree-hot electrically charged gas, or plasma, contained within its 16-foot-diameter outer chamber.

The results, published this week in the journal *Nature Physics*, confirm the counter-intuitive prediction that inside the device's magnetic chamber, random turbulence causes the plasma to become more densely concentrated — a crucial step to getting atoms to fuse together — instead of becoming more spread out, as usually happens with turbulence. This "turbulent pinching" of the plasma has been observed in the way plasmas in space interact with the Earth's and Jupiter's magnetic fields, but has never before been recreated in the laboratory.

Most experiments in fusion around the world use one of two methods: tokamaks, which use a collection of coiled magnets surrounding a donut-shaped chamber to confine the plasma, or inertial fusion, using high-powered lasers to blast a tiny pellet of fuel at the device's center. But LDX takes a different approach. "It's the first experiment of its kind," says MIT senior scientist Jay Kesner, MIT's physics research group leader for LDX, who co-directs the project with Michael E. Mauel, professor of applied physics at Columbia University's Fu Foundation School of Engineering and Applied Science.

The results of the experiment show that this approach "could produce an alternative path to fusion," Kesner says, though more research will be needed to determine whether it would be practical. For example, though the researchers have measured the plasma's high density, new equipment still needs to be installed to measure its temperature, and ultimately a much larger version would have to be built and tested.

A new approach to a tough problem

Kesner cautions that the kind of fuel cycle planned for other types of fusion reactors such as tokamaks, which use a mixture of two forms of "heavy" hydrogen called deuterium and tritium, should be easier to achieve and will likely be the first to go into operation. The deuterium-deuterium fusion planned for devices based on the LDX design, if they ever become practical, would likely make this "a second-generation approach," he says.

When operating, the huge LDX magnet is supported by the magnetic field from an electromagnet overhead, which is controlled continuously by a computer based on precision monitoring of its position using eight laser beams and detectors. The position of the half-ton magnet, which carries a current of one million amperes (compared to a typical home's total capacity of 200 amperes) can be maintained this way to within half a millimeter. A cone-shaped support with springs is positioned under the magnet to catch it safely if anything goes wrong with the control system.

Levitation is crucial because the magnetic field used to confine the plasma would be disturbed by any objects in its way, such as any supports used to hold the magnet in place. In the experimental runs, they recreated the same conditions with and without the support system in place, and confirmed that the confinement of the plasma was dramatically increased in the levitated mode, with the supports removed. With the magnet levitated, the central peak of plasma density developed within a few hundredths of a second, and closely resembled those observed in planetary magnetospheres (such as the magnetic fields surrounding Earth and Jupiter).

Summarizing the difference between the two approaches, Kesner explains that in a tokamak, the hot plasma is confined inside a huge magnet, but in the LDX the magnet is inside the plasma. The whole concept, he says, was inspired by observations of planetary magnetospheres made by interplanetary spacecraft. In turn, he says, for planetary research the experiments in LDX can yield “a lot more subtle detail than you can get by launching satellites, and more cheaply.”

The work ahead

The MIT and Columbia scientists say that if the turbulence-induced density enhancement exhibited by the LDX could be scaled up to larger devices, it might enable them to recreate the conditions necessary to sustain fusion reactions, and thus may point the way toward abundant and sustainable production of fusion energy.

“Fusion energy could provide a long-term solution to the planet’s energy needs without contributing to global warming,” says Columbia’s Mael.

The LDX project, led by Mael and Kesner and funded by the U.S. Department of Energy, has been through more than 10 years of design, construction and testing, and produced its first experimental results in its levitated configuration last year, which are being reported in the analysis published this week. A newly installed microwave interferometer array, developed by MIT graduate student Alex Boxer PhD ‘09, was used to make the precision measurements of the plasma concentrations that were used to observe the turbulent pinch.

“LDX is one of the most novel fusion plasma physics experiments underway today,” says Stewart Prager, director of the Princeton Plasma Physics Laboratory. Because of the unique geometry of the system, he says, “theoretical predictions indicate that the confinement of energy might be very favorable” for producing practical fusion power, but the theory needs to be confirmed in practice. “For these benefits to be realized, the somewhat bold theoretical predictions must be realized experimentally,” he says.

9. Giant laser reaches key milestone for fusion

By Jeff Hecht, Livermore
20:59 28 January 2010

<http://www.newscientist.com/article/dn18446-giant-laser-reaches-key-milestone-for-fusion.html>

The world's largest laser is approaching the long-sought goal of igniting a fusion reaction that produces more energy than the laser delivers. Lasers are intended to do this by super-heating a fusion fuel pellet until it implodes, heating and compressing its central core to the temperatures and pressures needed for nuclear fusion.

Past experiments have been plagued by irregular implosions that wasted most of the input energy. But now, researchers led by Brian MacGowan of the Lawrence Livermore National Laboratory in California have managed to squeeze targets of material into spheres rather than pancakes or more lopsided shapes, paving the way for future attempts at fusion.

The work was performed at Livermore's 192-laser beam National Ignition Facility (NIF), which began operating in 2009.

The team used targets that did not contain the key ingredients for fusion – two isotopes of hydrogen known as deuterium and tritium. But the symmetrical implosion of the targets suggests that NIF should be able to ignite fusion with laser pulses of 1.2 to 1.3 megajoules –

well below its full 1.8-megajoule capacity. "From everything we can see, we're on the right path here," Jeff Wisoff, a top NIF manager told *New Scientist*.

Researchers spent last year slowly cranking up the output of the laser, ultimately reaching a total energy of more than 1 megajoules. Now they're pausing to mount new instruments on the 10-centimetre-thick aluminium target chamber and to install giant concrete doors to contain neutrons they expect to produce in future fusion experiments.

In a few months, they will begin testing a series of new targets designed to assess beam interactions and compression. If all goes well, they could try for fusion ignition by the end of the year.

10. Laser fusion test results raise energy hopes

By Jason Palmer
Science and technology reporter, BBC News

<http://news.bbc.co.uk/2/hi/8485669.stm>

The experiment focuses 192 high-power laser beams to a tiny target

A major hurdle to producing fusion energy using lasers has been swept aside, results in a new report show.

The controlled fusion of atoms - creating conditions like those in our Sun - has long been touted as a possible revolutionary energy source. However, there have been doubts about the use of powerful lasers for fusion energy because the "plasma" they create could interrupt the fusion. An article in *Science* showed the plasma is far less of a problem than expected. The report is based on the first experiments from the National Ignition Facility (Nif) in the US that used all 192 of its laser beams. Along the way, the experiments smashed the record for the highest energy from a laser - by a factor of 20.

Star power

Construction of the National Ignition Facility began at Lawrence Livermore National Laboratory in 1997, and was formally completed in May 2009. The goal, as its name implies, is to harness the power of the largest laser ever built to start "ignition" - effectively a carefully controlled thermonuclear explosion. It is markedly different from current nuclear power, which operates through splitting atoms - fission - rather than squashing them together in fusion.

Proving that such a lab-based fusion reaction can release more energy than is required to start it - rising above the so-called breakeven point - could herald a new era in large-scale energy production. In the approach Nif takes, called inertial confinement fusion, the target is a centimetre-scale cylinder of gold called a hohlraum. It contains a tiny pellet of fuel made from an isotope of hydrogen called deuterium.

During 30 years of the laser fusion debate, one significant potential hurdle to the process has been the "plasma" that the lasers will create in the hohlraum. The fear has been that the plasma, a roiling soup of charged particles, would interrupt the target's ability to absorb the lasers' energy and funnel it uniformly into the fuel, compressing it and causing ignition.

Siegfried Glenzer, the Nif plasma scientist, led a team to test that theory, smashing records along the way. "We hit it with 669 kilojoules - 20 times more than any previous laser facility," Nif's Siegfried Glenzer told BBC News.

That isn't that much total energy; it's about enough to boil a one-litre kettle twice over. However, the beams delivered their energy in pulses lasting a little more than 10 billionths of a second. By way of comparison, if that power could be maintained, it would boil the contents of more than 50 Olympic-sized swimming pools in a second.

'Dramatic step'

Crucially, the recent experiments provided proof that the plasma did not reduce the hohlraum's ability to absorb the incident laser light; it absorbed about 95%. But more than that, Dr Glenzer's team discovered that the plasma can actually be carefully manipulated to increase the uniformity of the compression. "For the first time ever in the 50-year journey of laser fusion, these laser-plasma interactions have been shown to be less of a problem than predicted, not more," said Mike Dunne, director of the UK's Central Laser Facility and leader of the European laser fusion effort known as HiPER. "I can't overstate how dramatic a step that is," he told BBC News. "Many people a year ago were saying the project would be dead by now."

Adding momentum to the ignition quest, Lawrence Livermore National Laboratory announced on Wednesday that, since the Science results were first obtained, the pulse energy record had been smashed again. They now report an energy of one megajoule on target - 50% higher than the amount reported in Science. The current calculations show that about 1.2 megajoules of energy will be enough for ignition, and currently Nif can run as high as 1.8 megajoules.

Dr Glenzer said that experiments using slightly larger hohlraums with fusion-ready fuel pellets - including a mix of the hydrogen isotopes deuterium as well as tritium - should begin before May, slowly ramping up to the 1.2 megajoule mark. "The bottom line is that we can extrapolate those data to the experiments we are planning this year and the results show that we will be able to drive the capsule towards ignition," said Dr Glenzer.

Before those experiments can even begin, however, the target chamber must be prepared with shields that can block the copious neutrons that a fusion reaction would produce. But Dr Glenzer is confident that with everything in place, ignition is on the horizon. He added, quite simply, "It's going to happen this year."

11. Media cools on global warming

By Christopher Pearson, The Australian
February 06, 2010

<http://www.theaustralian.com.au/news/opinion/media-cools-on-global-warming/story-e6frq6zo-1225827002660>

Climate-change sceptics are being vindicated by scientific scandals that are no longer being ignored

LAST weekend looks likely to have been a tipping point in the media debate on climate change in the English-speaking world. The two daily papers in Britain which have campaigned most single-mindedly on the urgent need for action on man-made global warming have begun to change their tune.

The Independent's environment editor, Michael McCarthy, filed a piece under the head "Professor in leaked email scandal tried to hide fact that numbers he used were wrong". Previously The Independent has been underwhelmed by revelations arising out of Climategate, the hacking of computer files from the University of East Anglia's climate research unit.

But the evidence of suppressing data and trying to sideline freedom of information requests has called into question research findings which are fundamental to modern climatology.

Phil Jones, the suspended head of the East Anglia climate unit, collaborated with Wei-Chyung Wang on a major paper in Nature magazine on the urban heat island effect in 1990. Human activity and machinery emit heat, concrete and buildings store it. They found that urban developments near weather stations had had a negligible effect on the temperature increases recorded.

A lot of supposedly settled science rests on the assumption that we can rely on the integrity of the temperature record as presented, which explains why the issue has been pivotal for true believers in British journalism. McCarthy wrote: "It has been reported that when climate sceptics asked for the precise location of 84 stations, Jones at first declined to release the details. And when eventually he did release them, it was found that for the ones supposed to be in the countryside, there was no location given."

The only British newspaper more intensely committed to the theory of man-made global warming than The Independent is The Guardian. Its environment correspondent, Fred Pearce, took the story a step further.

He wrote: "The history of where the weather stations were sited was crucial to Jones's and Wang's study, as it concluded the rising temperatures recorded in China were the result of global climate changes rather than the warming effects of expanding cities . . . Wang said: 'When we started on the paper we had all the station location details in order to identify our network, but we cannot find them any more'."

In journalism this is usually referred to as "the-dog-ate-my-homework" excuse and that's clearly how Pearce views Wang's response.

He also quotes tellingly from one of the Climategate emails to Jones, which he once disdained. It was from Tom Wigley, an East Anglia colleague of Jones who harboured misgivings about the Nature paper. "Were you taking W-C W (Wang) on trust? Why, why, why did you and W-C W not simply say this right at the start?"

What makes these stories remarkable is less the content than the sources. Since about 2004 neither paper has previously displayed any intellectual curiosity over the possibility that the global warming paradigm might be open to question. Nor have they given balanced coverage to problems like "the hockey stick graph", a statistical trick that purported to abolish the medieval warming period.

It may be that the papers are testing the waters with a view to a more nuanced approach to unfolding evidence.

Alternatively, their editors may have concluded that not covering fresh facts that don't fit the theory is a sure-fire way of losing readers and reputation. Asked about The Guardian's change of tack, a spokesman said: "The Guardian editorial line is that global warming is happening and caused by human activities, but that does not mean we are blind to contradictory evidence. "It would be remiss of us journalistically to ignore a story like this where the actions of leading scientists are being seriously called into question. We asked Fred to do a thorough investigation into some of the unanswered questions."

On the domestic front, the collapse of Copenhagen and the catalogue of embarrassments for the UN Intergovernmental Panel on Climate Change have seen a number of unexpected developments in the past fortnight.

Melbourne ABC Radio's Jon Faine, who flatly refused to discuss Climategate on the grounds that it was unimportant, interviewed the visiting English campaigner, Christopher Monckton. Another true believer institution in Melbourne, The Age, for the first time in recent memory carried a sceptical piece in its op-ed pages by John Carroll.

In The Australian Financial Review, Laura Tingle allowed that the Rudd government's handling of the politics of climate change might have been overtaken by events. "On first appearances, you'd think that it all looks pretty depressing for the government. It's stuck with an ETS that almost everybody has now dumped on, even if they don't understand it (or in some cases because they do). It has stuck its colours to the mast of international co-operation and harmony, which has evaporated and become discredited."

In The Age, Michelle Grattan's commentary took a sudden, sibylline turn. "The warming Earth and Australia's expanding population are forcing the policy makers to lift their eyes beyond the short term. Admittedly, things change so quickly that trends can alter, and what we think now about some issues could be at odds with how people view them 40 years on." I may be reading too much into that gnomic second sentence, but it sounds like a preface to thinking the unthinkable; that the apocalyptic tide which threatened to inundate us may in fact be receding.

The ever-pragmatic Alan Kohler cut to the chase in Business Spectator with a summary of the main thrust of the Coalition's climate change policy and a comparison with the ETS. "The Coalition is proposing to pay the Latrobe Valley companies to convert from brown coal to gas . . . The Coalition's policy will have the benefit of being small and targeted, while the government's will have the benefit of being big enough to generate cash for a lot more voters than those living in the Latrobe Valley. But while the government's scheme used to have the benefit of being an ETS, in line with the global movement towards emissions trading, that movement has now stalled. If that global process doesn't restart soon, the government will be a shag on a rock with a new tax round its neck."

Tuesday's Newspann, which unsettled the government and encouraged the opposition, is further evidence that while the nation was notionally on holidays the IPCC's credibility problems had not gone unnoticed. Since Tony Abbott's rise to the leadership and the rejection of the ETS, the ALP's primary vote has fallen three percentage points (to 40), its two-party preferred vote has fallen four points (to 52) and dissatisfaction with Kevin Rudd has risen six points (to a high of 38 points).

In the past week the Prime Minister has made veiled threats about the option of a double dissolution and an election which would be at least in part a referendum on the ETS. Publicly and privately Abbott has welcomed the prospect, because opposition to the ETS is what has suddenly brought the Coalition back into serious contention.

Early elections are problematical at the best of times, because they suggest a government with the jitters. An election that might end up overlapping with Abbott's opinion poll honeymoon would be folly.

I expect an August or September poll in which, if the government has its way, the ETS will play a

relatively minor part. Since Rudd and Penny Wong have clearly decided that their scheme is too hard to explain, and one of the main attractions of the Coalition's is that it's easy to grasp, it's likely that the election will be fought on more familiar turf.

12. PROFILE: Barry Green- Green push for energy sustainability

By John Phaceas; WA Business News

11-February-10

<http://www.wabusinessnews.com.au/login.php?url=http%3A%2F%2Fwww.wabusinessnews.com.au%2Fstory%2F1%2F78438%2FPROFILE-Barry-Green-Green-push-for-energy-sustainability>

UNLIKELY as it may seem, Perth's long-gone iconic Boan's department store may one day be looked back on as ground zero of a cleaner and more sustainable nuclear age.

For it was at Boan's in 1958 that a young Perth science student caught the spark that would ultimately make him one of the world's leading experts on nuclear fusion.

13. Carbon price too low, argue British MPs

By Peter Wilson, Europe correspondent

From: The Australian February 13, 2010 12:00AM

<http://www.theaustralian.com.au/news/world/carbon-price-too-low-argue-british-mps/story-e6frq6so-1225829851288>

THE only large-scale "pollution trading" system in the world, run by the European Union, is failing to deliver green energy investment and will not succeed without a radical hike in the price imposed on polluters, British MPs say.

The price of emitting a tonne of carbon would have to rise from E15 (\$23) to about E100 a tonne to discourage pollution and drive new investment in low-carbon technology, according to an all-party committee chaired by senior Conservative MP Tim Yeo.

The British MPs' conclusion that the EU's emissions trading scheme is too soft on polluters is a stark warning to the Rudd government, which is proposing an emission trading system even more generous to heavy polluters.

The Rudd government's reliance on market-based emissions trading is the biggest difference between the Labor and opposition climate change policies.

A lengthy review of Europe's 27-nation ETS by the House of Commons' environment audit committee concluded that emissions trading was still the best way to reduce carbon emissions but it needed tighter emissions targets and may have to be backed by other measures, such as a carbon tax or minimum prices.

"If the government wants to kick-start serious green investment, it must step in to stop the price of carbon flatlining," Mr Yeo said.

As many carbon permits as possible should be auctioned instead of being issued free to heavy polluters, the British MPs said. The Rudd government has sought to placate industry opponents by promising large-scale allocations of free permits to heavy polluters such as power generators. The most potent lesson from Europe for countries considering carbon trading schemes is that it is not worth doing unless it imposes enough rigour on the market to change the behaviour of investors and polluters.

Mr Yeo, an environment minister in the government of John Major, said emissions trading "should be helping us to combat climate change, but at the moment the price of carbon simply isn't high enough to make it work".

"The recession has left many big firms with more carbon allowances than they need and carbon prices have collapsed."

Mr Yeo said the European scheme should one day join up with Australian and other schemes to form a global system but the looser standards of the foreign proposals would create the need for safeguards to protect the rigour of the European scheme.

A carbon "exchange rate" would be necessary to stop more freely available foreign credits from undermining the European prices, he said.

"Only a global effort will make a real difference in tackling climate change. Other countries outside Europe are developing emissions trading schemes, and these need to be joined up. "The government and the rest of Europe should actively push for this, while ensuring that in doing so action is taken to at least maintain the carbon price."

The committee reported that Britain, "with its European partners, should ensure that schemes are not merged without a well-founded 'exchange rate' in place."

Britain's main business lobby, the Confederation of British Industry, backed the committee's warning that carbon prices were too low.

CBI deputy director-general John Cridland said emissions trading "remains the best way to reduce carbon emissions cost-effectively, and is currently helping to achieve Kyoto Protocol and EU 2020 emissions targets".

The House of Commons committee heard evidence from a fund manager specialising in low-carbon investments that part of the problem was the success of major polluters in pleading for a soft start to emissions trading.

Climate Change Capital executive director James Cameron said it was crucial "not to have gentle sloping starts" despite "the evidence you generally get from industry, who tell you, be gentle on us to begin with".

Mr Cameron said such pleading "has been very successful recently in Australia: don't touch us now that the economy is in trouble".

"Actually the reverse is true. You really want emissions trading to confront you right away with a significant challenge to make you face up to the obligation to reduce" emissions and make the consequent investment decisions.

14. Blizzards mock global warming as both sides of debate try snow jobs

From: The Australian February 13, 2010 12:00AM

<http://www.theaustralian.com.au/news/world/blizzards-mock-global-warming-as-both-sides-of-debate-try-snow-jobs/story-e6frg6so-1225829851135>

WASHINGTON: US opponents of climate change action are seizing on a record snowfall in Washington DC in hopes of killing legislation to curb carbon emissions, which already faced uncertain political prospects.

Environmentalists have launched a swift counter-attack, pointing out that Olympics host Vancouver is facing a dearth of snow and saying the extreme weather may in fact offer proof, not a rebuttal, of dangerous climate change.

With Washington and other eastern US cities digging out from the heaviest snow in decades, conservatives have gone on the offensive and mocked leaders who warned about the planet's heating -- in particular, former vice-president Al Gore.

"It's going to keep snowing in DC until Al Gore cries 'uncle'," senator Jim DeMint, a Republican from South Carolina, wrote on micro-blogging website Twitter.

Republican senator James Inhofe of Oklahoma, a leading climate change sceptic, joined his

family in building an igloo on Capitol Hill with signs reading "Al Gore's new home" and "Honk if you love global warming".

The Virginia GOP ran ads against Tom Perriello and Rick Boucher, two conservative Democrats who support legislation to make industries pay for their emissions. "Tell them how much global warming you get this weekend . . . Maybe they'll come help you shovel," the ads said. US President Barack Obama sharply changed US policy on climate change when he took office last year. The House of Representatives in June approved the first nationwide plan to force cuts in carbon emissions blamed for global warming.

But the legislation has bogged down in the Senate, where Mr Obama's Democratic Party last month lost a seat to a Republican who opposes action on the heat-trapping gases. The Centre for American Progress, an Obama-friendly think tank led by former Clinton chief of staff John Podesta, cancelled its discussion on "The Global Implications of Climate Migration" because of the blizzard. The Finnish embassy rescheduled a party celebrating its climate-friendly rehabilitation project, saying "the record snowfall of the past few days is too much even for us Finns!"

Senator John Kerry, the leading force behind the legislation, dismissed suggestions that the snow could bury the bill.

"The inside-the-Beltway conventional wisdom that this issue has stalled is dead wrong," said Senator Kerry, a Democrat from Massachusetts. He said he was continuing work on a plan that would restrict emissions but also promote nuclear energy and offshore drilling, causes popular with Republicans.

One Republican senator, Lindsey Graham of South Carolina, is working with him. Environmentalists accused climate sceptics of misunderstanding the science behind snowstorms. While few meteorologists linked the blizzard directly to climate change, some said it showed the El Nino effect -- where unusually warm sea surface temperatures in the Pacific Ocean move east, pulling rainfall with them.

Jeff Masters, director of meteorology at the Weather Underground website, said the snow proved little more than that "we get pretty darn cold in the winter". "If it's cold enough to snow, you will get snow," he said. "We still have winter, even though temperatures have warmed on average about one degree Fahrenheit (0.5 Celsius) over the past 100 years."

The Obama administration has pledged to move ahead on climate change. It has signed on to an accord from December's UN summit in Copenhagen with a pledge to cut US emissions by 17 per cent by 2020 from 2005 levels. The storm, the result of two weather systems combining, brought Washington to a near standstill, disrupted air travel and knocked out power to thousands in the capital area. Thursday's snowstorm, the fourth in two weeks, topped off what's now the nastiest Washington winter on record -- and one of its foulest political seasons, too. For most of the week, all US government employees were told to stay home, and schoolchildren in the Washington, Virginia and Maryland area were given yet another day off.

As the storms have brought normal family routines to a skidding halt -- with a rare stretch of days free of school, work and almost every form of scheduled activity -- some are still loving the changed world that arrived with the snow a week ago, and others are ready to leave it behind. Across the Washington DC area, parents were grasping for ways to fill the days as two powerful snowstorms closed schools, daycare centres and many businesses. Yesterday -- day seven for some parents, with a three-day weekend ahead and more snow in the offing -- nerves were beginning to fray. "I am about ready to eat my children," said one mum, who declined to be named.

AFP

15. New review of climate science

PAOLA TOTARO, LONDON
February 13, 2010

<http://www.theage.com.au/world/new-review-of-climate-science-20100212-nxjb.html>

A BRITISH University's research on human activity and global warming is to be reassessed by a panel of independent scientists in a dramatic admission that the emails scandal has tarnished climate science. The University of East Anglia has announced that it will conduct an "independent, external reappraisal of the science" in papers and publications produced by its world-renowned Climatic Research Unit (CRU).

Professor Trevor Davies, the university's pro vice-chancellor for research, enterprise and engagement, said the Royal Society, Britain's revered national academy of science, is to help the university second "assessors with the requisite expertise, standing and independence".

"Published papers from CRU have gone through the rigorous and intensive peer review process which is the keystone for maintaining the integrity of scientific research," he said.

"That process and the findings of our researchers have been the subject of significant debate in recent months. Colleagues in CRU have strenuously defended their conduct and the published work and we believe it is in the interests of all concerned that there should be an additional assessment considering the science itself."

The new independent review is much broader than the inquiry headed by Sir Muir Russell, who has been charged with investigating how the emails themselves came into the public domain along with key allegations that CRU scientists refused and manipulated requests for data as well as working to suppress publication of the work of critics in scientific publications. The decision to establish a new inquiry is a stark admission that scientific - as well as public - trust has been severely eroded by the scandal and a fresh slate is needed to restore confidence in both the data and its conclusions.

The CRU is one of Britain's peak research centres on climate science and has been instrumental in the collection of data recording global temperatures, which is published by the British Meteorological Office. This data forms the underpinning of UK climate change policy, including short and long-term targets for carbon emission cuts. The CRU has been a key informant to the Intergovernmental Panel on Climate Change and its reports on the effect of human activity and global warming.

Professor Davies said the Royal Society would propose the names of scientists for the controversial review but that, in the end, the university would make final appointments. He said reassessment of all CRU's key publications would be completed at "the earliest date the assessors can manage" and the findings made public.

The announcement came as Sir Muir, a former vice-chancellor of Glasgow University, announced the long-awaited terms of reference for his inquiry into the email leaks. He said work would focus on the claims sparked by the leaked emails, including whether the data used to make conclusions about the rate of climate change was properly managed. Some of the most contentious emails, including ones that referred to tree-ring measurements and an alleged bid to "hide the decline" in temperatures, will be investigated along with claims that uncertain data was underplayed and other data deleted to avoid requests for information from critics or "rival" researchers.

Sir Muir said the results of his inquiry would be published but warned that it would not "audit the [CRU's] scientific conclusions", only the scientists' behaviour and how they followed data procedures.

16. Scientists say IPCC should be overhauled or scrapped

Leigh Dayton, Science writer

From: The Australian February 11, 2010 12:00AM

<http://www.theaustralian.com.au/news/nation/scientists-say-ipcc-should-be-overhauled-or-scrapped/story-e6frg6nf-1225828951315>

INTERNATIONAL scientists have called for the world's peak climate change body to be revamped or scrapped after damaging controversies that have dogged the expert panel in recent months.

The scientists suggest a range of options, from tightening the selection of lead authors and contributors to the International Panel on Climate Change, to dumping it in favour of a small permanent body, or even turning the whole climate science assessment process into a moderated "living" Wikipedia-IPCC.

Writing today in the journal *Nature*, five US, British, German and Swiss climate scientists - all contributing or lead IPCC report authors - agreed a mechanism for assessing the facts and impacts of climate change was critical.

But they acknowledged that calls for reform had intensified after what *Nature* called "recent furores". Last month, for instance, it was revealed that flawed communication between teams of scientists led to the IPCC's inaccurate claim that most Himalayan glaciers would melt almost 300 years earlier than forecast. In November, the release of hacked email messages between climate scientists triggered widespread media reports of scientific wrongdoing.

According to Mike Hulme, from Britain's University of East Anglia, the structure and process of the IPCC has passed its sell-by date. "The IPCC is no longer fit for the purpose," he wrote in *Nature*.

In Australia, Barry Brook, the director of climate change research at Adelaide University, agreed, saying: "I wouldn't be disturbed if there wasn't ever another IPCC report, provided we replaced it with something more timely, concise and relevant to policy makers," he said.

Professor Andy Pitman, co-director of the UNSW Climate Change Research Centre, disagreed. The "IPCC is the most rigorous program of assessing the state of (the) science. It's as near perfect as such a process can be".

Thomas Stocker, of the University of Bern in Switzerland, argued the "bottom-up" and peer-review principles of the IPCC were sound and should be carefully maintained. If so, he said, the panel could continue to be an "honest broker".

US-based director of climate change adaptation with the World Wide Fund for Nature, Jeff Price, went further, arguing the panel should improve its author and reviewer choice and produce annual reports, not taking four or more years as at present.

According to Dr Hulme, however, the IPCC should be broken into three panels, reflecting current working groups.

The University of Alabama's John Christy said the IPCC should be dismantled. Rotating groups of four to eight lead authors could manage a Wikipedia-style process that would reflect diverse scientific opinion.

17. World wide web of doubt

Christopher Pearson

From:

The Australian February 13, 2010 12:00AM

<http://www.theaustralian.com.au/politics/opinion/world-wide-web-of-doubt/story-e6frgd0x-1225829874281>

The internet is allowing climate change sceptics to gain traction.

PUBLIC confidence in the supposedly settled science of global warming is in free fall, especially in the English-speaking world. On Sunday a poll was published in Britain that compared the results from a new BBC phone survey with one conducted in November, the month the Climategate hacked emails were released.

Since November, the proportion of respondents who thought global warming was an established fact largely attributable to human activity fell from 41 per cent to 26 per cent. Those who thought climate change was happening but that it wasn't yet proven to be man-made increased from 32 per cent to 38 per cent. Those who thought climate change was real but that blaming it on mankind was environmentalist propaganda rose from 8 to 10 per cent. Who said climate change was not happening rose from 15 to 25 per cent.

On the home front, on Monday the Nielsen poll found that since late November, support for the emissions trading scheme had fallen from a stable reading of 66 per cent to 56 per cent. Opposition to the ETS rose from 25 per cent to 29 per cent. Echoing the level of confusion and waning confidence in the science, 45 per cent said they preferred Tony Abbott's emissions reduction fund, while 39 per cent preferred the government's ETS. However 43 per cent approved of Kevin Rudd's broad approach and 30 per cent approved of Abbott's. Essential Research's latest poll tells a similar story. Asked about Abbott's approach to climate change, a total of 34 per cent approved, a total of 29 per cent disapproved and 37 per cent said they didn't know. On which party had the best climate change policy, the Coalition went from 27 per cent in December to 25 per cent and Labor from 24 per cent to 19 per cent. Support for the Greens was stable on 17 per cent and the "don't knows" increased from 32 per cent to 39 per cent.

We can be reasonably confident public opinion will follow the same trajectory in Australia as it has in Britain. (Just as an aside, it is probably the strongest argument in favour of Rudd calling an early election.) Short of compelling fresh evidence to support anthropogenic global warming, it's highly unlikely that there will be any movement in the opposite direction. What we are witnessing, in defiance of officialdom, government propaganda and the bulk of funded researchers in the field, is the collapse of a scientific paradigm. This is something that has never happened before. Politically speaking, it's a game-changer with the potential to overturn the normative assumptions commentators rely on. Not least of these is the idea that Australian voters will always give newly elected federal governments a second term.

In the latest edition of *The Spectator*, Matt Ridley, a veteran science journalist, offers an explanation for how the consensus came unstuck. "Despite 20 years of being told they were not just factually but morally wrong, of being compared to Holocaust deniers, of being told they deserved to be tried for crimes against humanity, of being avoided at parties, climate sceptics seem to be growing in number and confidence by the day. What is the difference?"

"In a word, the internet. The 'climate consensus' may hold the establishment -- the universities, the media, big business, government -- but it is losing the jungles of the web. After all, getting research grants, doing pieces to camera and advising boards takes time. The very ostracism the sceptics suffered has left them free to do their digging untroubled by grant applications and invitations to Stockholm."

Part of Ridley's argument is that it's distinguished scientists in retirement, who have no fear of faculty censure or funding bodies and have nothing to lose, who have led the internet revolt. In Australia, that body includes Garth Paltridge, the author of *The Climate Caper*, and William Kininmonth, author of *Climate Change: A Natural Hazard*. As well as publishing books and journal

articles, both have an internet presence.

Other local participants in the internet debate include Jennifer Marohasy, a doctoral fellow of the Institute of Public Affairs, and Joanne Nova at her blog JoNova. She is a freelance science presenter and author of a bestseller, *The Sceptic's Handbook*. Two News Limited journalists, Andrew Bolt and Tim Blair, have been especially diligent in keeping their mass audiences informed of fresh evidence as it has emerged, via their newspaper columns and, more important, their blogs.

Ridley gives pride of place to Stephen McIntyre, a retired mining consultant in Toronto with a genius for forensic statistical analysis. He was the one who back in 2003 first exposed the problematical data and the sleight of hand underpinning the hockey-stick graph, which purported to abolish the medieval warming period. Ridley notes: "He has also uncovered a mistake in data that conveniently prevented 1934 being warmer than 1998 in America; the splicing together of the records of two Antarctic weather stations as if they were one; the smoothing of sea-level rise in a way that conveniently concealed its recent deceleration; the use of a Swedish lake sediment series upside down so it showed recent warming instead of cooling; and most recently the reliance of an attempt to resuscitate the hockey stick on a ludicrously small sub-sample of just 12 Siberian larch trees."

One of my daily reads in recent years is wattsupwiththat.com, a site founded in 2006 by Anthony Watts, a former Californian television weather forecaster. As Ridley notes: "Dedicated at first to getting people to photograph weather stations to discover how poorly sited many of them are, the site has metamorphosed from a gathering place for lonely nutters to a three-million-hits-per-month online newspaper on climate full of fascinating articles by physicists, geologists, economists and statisticians."

Providing forums for sceptically minded scientists and experts in related fields has been a very effective means of getting around the problem that most of the peer-reviewed journals were under the editorial control of committed proponents of anthropogenic global warming. The uncontrollable nature of internet communication meant that, through time, cutting-edge argument was more likely to be found in the blogosphere than in refereed journals. Academic climatologists such as Roy Spencer and the "luke-warmist" Roger Pielke Jr have lent depth and plausibility to online debate.

The very high hit rates on the leading sites in the wake of Climategate finally persuaded newspaper editors to unleash teams of investigative journalists in an attempt to catch up. The only media that have so far failed to respond to the public's appetite for up-to-date news and analysis are the state-subsidised national broadcasters. It's widely assumed that the internet is inherently suited to furthering the causes of the left-leaning young, as evidenced by Barack Obama's campaign and fundraising strategies. But the blogosphere's role in the collapse of the climate consensus suggests middle-aged and elderly net users are equally capable of making their presence felt on a democratic medium. Another widely held assumption is that, having endured 12 years of indoctrination on climate change at school, young people are en bloc firmly committed to the cause. My guess is that young nerdy science students generally don't buy the official line. The people who do tend to be PhD students in politics and sociology, taking it on trust. This has been yet another week when it wasn't easy being green, with more embarrassments for the Intergovernmental Panel on Climate Change.

To cap it off, the Prius has been recalled. Is nothing sacred?

18. UN climate panel under strain

From: The Australian February 15, 2010 12:00AM

<http://www.theaustralian.com.au/news/un-climate-panel-under-strain/story-e6frg6xf-1225830258725>

THE UN climate panel faces a new challenge, with scientists casting doubt on its claim that global temperatures are rising inexorably because of human pollution.

In its last assessment, the Intergovernmental Panel on Climate Change warned that greenhouse

gases had already heated the world by 0.7C and there could be 5-6C more warming by 2100. New research has cast doubt on such claims.

"The temperature records cannot be relied on as indicators of global change," said John Christy, professor of atmospheric science at the University of Alabama, in Huntsville, and a former lead author on the IPCC.

The doubts of Professor Christy and several other researchers focus on the thousands of weather stations around the world, which have been used to collect temperature data over the past 150 years. They believe these stations have been seriously compromised by factors such as urbanisation, changes in land use and, frequently, being moved from site to site.

Professor Christy has published research papers looking at these effects in three different regions: east Africa and the US states of California and Alabama. "The story is the same for each one," he said. "The popular data sets show a lot of warming but the apparent temperature rise was actually caused by local factors affecting the weather stations, such as land development."

The IPCC faces similar criticisms from Ross McKittrick, professor of economics at the University of Guelph, in Ontario, Canada, who was invited by the panel to review its last report. The experience turned him into a critic and he has since published a research paper questioning its methods: "We concluded, with overwhelming statistical significance, that the IPCC's climate data are contaminated with surface effects from industrialisation and data-quality problems."

Such warnings are supported by a study of US weather stations co-written by Anthony Watts, a US meteorologist and climate change sceptic. His study, which has not been peer-reviewed, is illustrated with photographs of weather stations in locations where their readings are distorted by heat-generating equipment.

The Sunday Times

19. Top climate scientist calls for study rethink

From: The Australian February 16, 2010 12:00AM

<http://www.theaustralian.com.au/news/top-climate-scientist-calls-for-study-rethink/story-e6frg6xf-1225830683883>

THE UN body that advises world leaders on climate change must investigate an apparent bias in its report that resulted in several exaggerations of the impact of global warming, according to the panel's former chairman.

Robert Watson said all the errors exposed so far in the report by the Intergovernmental Panel on Climate Change resulted in overstatements of the severity of the problem.

Professor Watson, now chief scientific adviser to Britain's Department for Environment, Food and Rural Affairs, said that if the errors had just been innocent mistakes, as was claimed by current chairman Rajendra Pachauri, some would probably have understated the impact of climate change. The errors have emerged in the past month after checking of the sources cited by the 2500 scientists who produced the report.

The report falsely claimed that Himalayan glaciers would disappear by 2035, when evidence suggested that they would survive for another 300 years. It also claimed that global warming could cut rain-fed North African crop production by up to 50 per cent by 2020. A senior IPCC contributor has since admitted that there is no evidence to support this claim.

In the latest error to emerge, the Dutch government yesterday asked the IPCC to correct its claim that more than half of The Netherlands was below sea level. The environment ministry said that 26 per cent of the country was below sea level. The IPCC admitted the error, saying that 55 per cent was the area at risk of flooding.

Professor Watson, who served as IPCC chairman from 1997-2002, said: "The mistakes all appear to have gone in the direction of making it seem like climate change is more serious by overstating the impact. That is worrying. The IPCC needs to look at this trend in the errors and ask why it happened." He said the IPCC should employ graduate students to check the sources of claims made in its next report, due in 2013. "Graduate students would love to be involved and they could really dig into the references and see if they really do support what is being said," he said.

Professor Watson said that the next report should acknowledge that some scientists believed the planet was warming at a much slower rate than has been claimed by the majority of scientists. "We should always be challenged by sceptics," he said. "The IPCC's job is to weigh up the evidence. If it can't be dismissed, it should be included in the report. Point out it's in the minority and, if you can't say why it's wrong, just say it's a different view." Dr Pachauri failed to respond to questions put to him about Professor Watson's comments.

Meanwhile, a member of the inquiry team investigating allegations of misconduct by climate scientists has admitted that he holds strong views on climate change, contravening a founding principle of the inquiry. Geoffrey Boulton, who was appointed last week by the inquiry chairman, Muir Russell, said he believed that human activities were causing global warming. Sir Muir issued a statement last week claiming that the inquiry members did not have a "predetermined view on climate change and climate science".

The Times, AFP

20. Climategate is just the tip of the iceberg

David Henderson

From: The Australian February 16, 2010 12:00AM

<http://www.theaustralian.com.au/politics/opinion/climategate-is-just-the-tip-of-the-iceberg/story-e6frgd0x-1225830658086>

A litany of climate science flaws can't be ignored and highlight the need for an open review and evolutionary policies

TWO recent episodes have given rise to concerns about the quality and reliability of expert advice on climate change. First was the unauthorised release of a mass of emails from the Climatic Research Unit at the University of East Anglia: the contents have put in question the conduct of CRU scientists and some of their correspondents.

Second is the discovery that statements made in the fourth and most recent assessment report (AR4) from the Intergovernmental Panel on Climate Change were based on sources that should not have been given weight. In relation to what was said about Himalayan glaciers, the IPCC has issued a formal admission of error. The concerns raised by these episodes are well founded. However, Climategate and Glaciergate are not to be viewed in isolation. They are instances of a more fundamental and deeply entrenched phenomenon. In relation to climate change, the established official expert advisory process governments have commissioned and relied on has shown itself to be not professionally up to the mark. The situation is one of unwarranted trust.

The main headings of unprofessional conduct within the process, identified and documented before the recent revelations, are:

I Over-reliance on in-group peer review procedures that do not serve as a guarantee of quality and do not ensure due disclosure

I Serious and continuing failures of disclosure and archiving in relation to peer-reviewed studies.

I Resistance to disclosure of basic information that reputable journals insist on as a precondition for acceptance. (In the CRU emails, participants discuss a range of arguments, pretexts and devices that could be used to fend off disclosure, including the deletion of emails containing material that

had been sought under FOI requests, requests made only because authors had not followed accepted scholarly procedures).

I Basic errors in the handling of data, through failure to consult or involve trained statisticians.

I Failure to take due account of relevant published work documenting these lapses, while disregarding IPCC criteria for inclusion in the review process.

I Failure to take due note of comments from dissenting critics who took part in the AR4's preparation.

I Resisting the disclosure of professional exchanges within the AR4 drafting process, despite the formal instruction of member governments that the IPCC's proceedings should be "open and transparent".

I Failure by the IPCC and its directing circle to acknowledge and remedy these deficiencies.

In the light of Glacieregate, one could add to the list reliance on worthless (non-peer-reviewed) sources. But mere insistence on peer review would leave in place the other basic flaws. Comprehensive exposure of these flaws has come from a number of independent commentators. Particular mention should be made of Canadian authors Stephen McIntyre and Ross McKittrick: separately and in joint publications, going back to 2003, they have made an outstanding contribution to public debate. Together with a perceptive British critic, David Holland, they are the subject of unfavourable references in the CRU emails. But their work and that of other critics has been disregarded by governments and commentators in academic journals and the media alike.

The glaring defects in the expert advisory process have gone unacknowledged and unremedied by what I call the environmental policy milieu. This high-level failure and the defects themselves have resulted from chronic and pervasive bias. Right from the start, members of the milieu, and of the IPCC's directing circle, have been characterised by what has been well termed "pre-commitment to the urgency of the climate cause". Although the IPCC in particular is now under fire, this is too restricted a focus. It is true that the panel's work forms the leading element in the official expert advisory process. But the basic problem of unwarranted trust goes further: it extends to the chronically biased treatment of climate change issues by responsible departments and agencies that the panel reports to, and in nationally based organisations that they finance (such as the CRU).

It is not just the environmental policy milieu that is to blame for the mishandling by governments of climate change issues. As a former Treasury official and international civil servant, I have been surprised by the failure of economic departments in OECD member countries to audit the evidence bearing on climate change issues, their uncritical acceptance of the results of a process of inquiry so obviously biased and flawed, and their lack of attention to the criticisms of that process voiced by independent outsiders -- criticisms they ought to have been making themselves. A similar lack of resource has characterised the research department of the IMF and the economics department of the OECD. There has been a conspicuous failure of due diligence.

The chief moral to be drawn is simple. In an area of policy where so much is at stake, and so much remains uncertain and unsettled, policies should be evolutionary and adaptive, rather than presumptive as they are now; and their evolution should be linked to a process of inquiry and review that is more thorough, balanced, open and objective.

David Henderson was formerly head of the OECD economics and statistics department. He is a fellow of the Institute of Economic Affairs in London and chairman of the Academic Advisory Council of the Global Warming Policy Foundation.

21. IPCC scaremongering is destroying its credibility

Bjorn Lomborg

From: The Australian February 17, 2010 12:00AM

<http://www.theaustralian.com.au/news/ipcc-scaremongering-is-destroying-its-credibility/story-e6frg6xf-1225831116193>

AS George W. Bush and Tony Blair learned the hard way, the public does not take kindly to being misled about the nature of potential threats.

The after-the-fact revelation that the reasons for invading Iraq were vastly exaggerated and in some cases completely fabricated produced an angry backlash that helped toss the Republicans out of power in the US in 2008 and may do the same to Britain's Labour Party this year.

A similar shift in global public opinion is occurring with respect to climate change. The process picked up momentum late last year, after hackers leaked thousands of emails from a top British research facility showing that some of the world's most influential climatologists had been trying to disguise flaws in their work, blocking scrutiny, and plotting together to enforce what amounts to a party line on climate change. More recently, the UN's respected advisory group the Intergovernmental Panel on Climate Change has been deeply embarrassed by the revelation that some alarming predictions contained in an influential report that it released in 2007 have little or no scientific basis.

Although none of these lapses provides any reason to doubt that global warming is real, is man-made, and will create problems for us, these challenges to the IPCC are taking their toll. Indeed, recent surveys show the public is growing steadily less trusting of the scientific consensus on global warming.

The biggest headlines about IPCC errors concern a claim about melting Himalayan glaciers that it made in its 2007 report on the likely impacts of climate change. "Glaciers in the Himalaya are receding faster than in any other part of the world," the report noted, adding that "if the present rate continues, the likelihood of them disappearing by the year 2035 and perhaps sooner is very high". As it happens, this prediction was not based on any peer-reviewed scientific research but was lifted from a report by the World Wildlife Fund, which was repeating unproven speculation by a single researcher.

This lack of scientific basis did not stop countless global-warming activists from citing the glacier prediction at every opportunity. When the Indian government suggested last year that the Himalayan glaciers were in better shape than the IPCC claimed, the IPCC's chairman, Rajendra Pachauri, dismissed India's objections as being based on "voodoo science".

This month, the Indian government reacted to the revelations about the baseless nature of the glacier claim by announcing plans to establish what amounts to its own Indian IPCC to assess the impact of global warming. India's Environment Minister Jairam Ramesh declared: "There is a fine line between climate science and climate evangelism. I am for climate science."

Climate evangelism is an apt description of what the IPCC has been up to, for it has exaggerated some of the ramifications of climate change in order to make politicians take note. Murari Lal, the co-ordinating lead author of the section of the IPCC report that contained the Himalayan error, admitted he and his colleagues knew the dramatic glacier prediction was not based on any peer-reviewed science. Nonetheless, he explained, "we thought that if we can highlight it, it will [influence] policymakers and politicians and encourage them to take some concrete action."

The concrete action they had in mind was getting governments to mandate drastic cuts in carbon dioxide emissions.

Activists have been pursuing this approach to tackling global warming without success for nearly 20 years, most recently at December's failed climate summit in Copenhagen. The problem is that it is too expensive a solution for politicians and the public to swallow easily, which is why many well-meaning climate scientists have apparently concluded that instead of relying on reasoned discussion, they might as well try to scare us witless.

Consider what the IPCC had to say about extreme weather events such as intense hurricanes. The cost of such events in terms of destroyed property and economic disruption has been rising steadily. Every peer-reviewed study has shown this is not because of rising temperatures but because more people live in harm's way.

Nonetheless, in the IPCC's influential 2007 assessment of climate change, the panel's Working Group II (charged with assessing the potential impact of global warming) chose to cite one, then unpublished study that supposedly found global warming had doubled damage costs over the past 35 years. In fact, when this study was finally published it stated categorically there was "insufficient evidence" to link the increased losses to global warming. In other words, what Working Group II reported was wrong.

Elsewhere in the 2007 assessment, Working Group II claimed that "up to 40 per cent of the Amazonian forests" were at imminent risk of being destroyed by global warming. The basis for this claim was a single report from the WWF that itself cited only one study, which didn't even look at climate change but rather at the impact of human activities such as logging and burning. In similar fashion, Working Group II claimed that "by 2020, in some [African] countries, yields from rain-fed agriculture could be reduced by up to 50 per cent". Much quoted since, this alarming statistic turns out to have been based on a single, unreferenced bullet point from a report by an environmental think tank.

There are numerous other examples of similar shenanigans by Working Group II. Yet, aside from a grudging admission that its predictions about Himalayan glaciers were "poorly substantiated", the IPCC has yet to acknowledge, much less apologise for, any of the lapses.

If the IPCC is to do its job properly, it must own up to all of its missteps and clean house. Nobody expects it to be infallible. But neither should we tolerate its attempts to scare policymakers rather than inform them.

Bjorn Lomborg is director of the Copenhagen Consensus Center at Copenhagen Business School

New section on “Educational Material”

“There are some websites listed below with information to assist the understanding of fusion energy and its applications.

5. Physics of a Fundamental Energy Source - FusEdWeb | Fusion Education

An introduction to the principles of **fusion** geared towards high school students. Posters in various languages also available for download or ordering.

<http://fusedweb.llnl.gov/CPEP/>

6. How the Sun Shines

By John N. Bahcall
29 June 2000

http://nobelprize.org/nobel_prizes/physics/articles/fusion/index.html

What makes the sun shine? How does the sun produce the vast amount of energy necessary to support life on earth? These questions challenged scientists for a hundred and fifty years, beginning in the middle of the nineteenth century. Theoretical physicists battled geologists and evolutionary biologists in a heated controversy over who had the correct answer.

7. Fusion Basics

17 Feb 1999 ...

Princeton Plasma **Physics** Laboratory. **Fusion** Basics. **Fusion** Energy · Advantages of **Fusion** · How **Fusion** Energy is Produced · **Fusion** Reactions ...

www.pppl.gov/fusion_basics/pages/fusion_basics.html - [Cached](#) - [Similar](#)

8. The General Atomics Fusion Education Outreach Program

Rick Lee

<http://www.aps.org/units/fed/newsletters/summer2006/generalatomics.html>

Explains the program and educational material can be found at <http://fusioned.gat.com/>
In the FUN Zone

<http://fusioned.gat.com/movie.html>

there are movies and games!”