

## ITER News Log August 2011

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### 1. Research says reef can fight warming

Jamie Walker; Matthew Franklin, The Weekend Australian; 23 July 2011

<http://theaustralian.newspaperdirect.com/epaper/viewer.aspx> k

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Australian research rejects forecasts that the Great Barrier Reef will be destroyed within a generation by climate change, and finds that corals are capable of adapting better than previously believed.

The study, reported in the international journal Science, accepts that reefs are threatened by global warming and are already deteriorating — just not as quickly as some predictions for the Great Barrier Reef hold.

### 2. Sea-level rises are slowing, tidal gauge records show

Stuart Rintoul; The Australian; 22 July 2011

<http://www.theaustralian.com.au/national-affairs/sea-level-rises-are-slowing-tidal-gauge-records-show/story-fn59niix-1226099350056>

ONE of Australia's foremost experts on the relationship between climate change and sea levels has written a peer-reviewed paper concluding that rises in sea levels are "decelerating".

The analysis, by NSW principal coastal specialist Phil Watson, calls into question one of the key criteria for large-scale inundation around the Australian coast by 2100 -- the assumption of an accelerating rise in sea levels because of climate change.

Based on century-long tide gauge records at Fremantle, Western Australia (from 1897 to present), Auckland Harbour in New Zealand (1903 to present), Fort Denison in Sydney Harbour (1914 to present) and Pilot Station at Newcastle (1925 to present), the analysis finds there was a "consistent trend of weak deceleration" from 1940 to 2000.

Mr Watson's findings, published in the Journal of Coastal Research this year and now attracting broader attention, supports a similar analysis of long-term tide gauges in the US earlier this year. Both raise questions about the CSIRO's sea-level predictions.

Climate change researcher Howard Brady, at Macquarie University, said yesterday the recent research meant sea level rises accepted by the CSIRO were "already dead in the water as having no sound basis in probability".

"In all cases, it is clear that sea-level rise, although occurring, has been decelerating for at least the last half of the 20th century, and so the present trend would only produce sea level rise of around 15cm for the 21st century."

Dr Brady said the divergence between the sea-level trends from models and sea-level trends from the tide gauge records was now so great "it is clear there is a serious problem with the models".

"In a nutshell, this factual information means the high sea-level rises used as precautionary guidelines by the CSIRO in recent years are in essence ridiculous," he said. During the 20th century, there was a measurable global average rise in mean sea level of about 17cm (plus or minus 5cm).

But scientific projections, led by the Intergovernmental Panel on Climate Change, have suggested climate change will deliver a much greater global tide rise in mean sea level this century of 80-100cm.

The federal government has published a series of inundation maps based on the panel's predictions showing that large areas of Australia's capital cities, southeast Queensland and the NSW central coast will be under water by 2100.

Without acceleration in sea-level rises, the 20th-century trend of 1.7mm a year would produce a rise of about 0.15m by 2100.

Mr Watson's analysis of the four longest continuous Australian and New Zealand records is consistent with the findings of US researchers Robert Dean and James Houston, who analysed monthly averaged records for 57 tide gauges, covering periods of 60 to 156 years.

The US research concluded there was "no evidence to support positive acceleration over the 20th century as suggested by the IPCC, global climate change models and some researchers".

Mr Watson cautioned in his research and again yesterday that studies of a small number of northern hemisphere records spanning two or three centuries had found a small acceleration in sea-level rises. He said it was possible the rises could be subject to "climate-induced impacts projected to occur over this century".

Mr Watson's research finds that in the 1990s, when sea levels were attracting international attention, although the decadal rates of ocean rise were high, "they are not remarkable or unusual in the context of the historical record at each site over the 20th century".

"What we are seeing in all of the records is there are relatively high rates of sea-level rise evident post-1990, but those sorts of rates of rise have been witnessed at other times in the historical record," he said.

"What remains unknown is whether or not these rates are going to persist into the future and indeed increase."

He said further research was required, "to rationalise the difference between the acceleration trend evident in the global sea level time-series reconstructions (models) and the relatively consistent deceleration trend evident in the long-term Australasian tide gauge records".

With an estimated 710,000 Australian homes within 3km and below 6m elevation of the coast, accurate sea-level predictions are vital for planning in coastal areas anticipating predicted sea-level rises of almost a metre by 2100.

### **3. 'Man-made pollution reflects sun'**

Brendan O'Keefe; The Australian, 22 July 2011

<http://www.theaustralian.com.au/national-affairs/climate/man-made-pollution-reflects-sun/story-e6frg6xf-1226099326730>

FAR from warming the planet rapidly, man-made pollution might actually be contributing to a slowing of global warming, a US study suggests.

Aerosol particles from activities such as burning coal, particularly in the past decade, reflect sunlight back into space, slowing the rapid warming observed up to and including 1998.

Reporting in the journal *Science* today, study leader Susan Solomon, of the National Oceanographic and Atmospheric Administration, says she and her team observed that an increase in stratospheric aerosols had cut by 20 per cent the global warming that would have otherwise occurred since 1998.

The paper also suggests that increased concentrations of aerosols cut by 0.05C the global warming that would otherwise have occurred between 1960 and 2000.

Since 1960 the mean temperature in Australia has risen by about 0.7C.

According to World Meteorological Organisation data, last year, 2005 and 1998 were the globe's warmest years on record.

Atmospheric aerosols are tiny solid or liquid particles that can come from volcanoes, sea salt or dust, but also from anthropogenic activity, such as the burning of fossil fuels, which send sulphur dioxide into the atmosphere.

Natural aerosols from volcanoes, notably massive eruptions at El Chichon in Mexico in 1982 and Pinatubo in The Philippines in 1991, have slowed global warming at times.

But the Solomon study suggests that in the absence of huge eruptions since Pinatubo (Iceland and Chile eruptions are too recent) a rise in man-made aerosols has reflected enough sunlight to alone slow the pace of global warming.

The paper says: "Some studies have suggested that an important source of the background stratospheric aerosol layer may be anthropogenic sulphur (SO<sub>2</sub> from coal burning and biomass burning)."

Combining ground-based and satellite measurements, the scientists observed "increases in stratospheric aerosols from 2000 to 2010 of about 7 per cent per year. Over the decade since 2000, carbon dioxide increased by about 0.5 per cent per year".

University of Melbourne meteorologist David Karoly said the study provided "the most complete evaluation of background levels (of aerosols) and how they have increased over the last decade or so".

"What this paper does is estimate the contribution of this increased amount of aerosols in the stratosphere (15km to 50km above earth) to cooling the climate system over last decade," Professor Karoly said.

"It says this might have masked as much as a quarter of the contribution from increased greenhouse gases in fossil fuel burning in developing countries such as China and India.

"Another possibility not mentioned in paper is . . . large bushfires injecting particles into the stratosphere in what are called pyrocumulus clouds that act as a way of transporting aerosols from the lower atmosphere to the stratosphere. There have been a number of studies showing that might be an important source."

#### **4. Paralysed by our anti-nuclear hysteria**

Greg Sheridan, Foreign editor; *The Australian*, 23 July 2011

<http://www.theaustralian.com.au/news/world/paralysed-by-our-anti-nuclear-hysteria/story-e6frg6ux-1226100028747>

AUSTRALIA should buy or lease a fleet of nuclear-powered submarines to replace the calamitous Collins-class boats nearing the end of their working lives.

Having given you the pay-off line, let me tell you how I get there.

Australia is the most pleasant, and in many ways the luckiest, country in the world. Part of that luck is that, with the exception of the Japanese threat in World War II, we have never had to fight a war of national survival, and we have always had a great and powerful ally. But we are a long way from any strategic friends and we are always uneasy about our security.

The combination leaves us schizophrenic: never prepared to work diligently to provide for our security, but never willing to admit that dereliction, either. As a result, we make an effort in defence, but never a serious effort.

On most issues, including defence, but also beyond defence, popular Australian opinion is pretty wise. Elite opinion, on the other hand, is formed too much by government-funded bodies, and therefore subject to group thinking and the sterility of bureaucratic self replication and orthodoxy, to be wise.

Popular opinion is grateful for our national endowments, cautious about radical change, empirical in every best sense. In energy policy, the overwhelming fact about Australia is our abundant endowment of fossil fuels.

On one issue, a fairly toxic interaction of anachronistic elite opinion and the popular faith in fossil fuels has led to one of the most debilitating Australian syndromes: our completely kooky phobia about anything to do with nuclear power. This is hurting us in energy planning, foreign policy and, crucially, defence.

Take energy first. The perfect test for seriousness about combating greenhouse gas emissions is our attitude to nuclear energy. Unless you are a Greens/Taliban fundamentalist seeking to de-industrialise the West, you are not serious about climate change if you oppose nuclear energy. It is the only non-greenhouse gas-emitting alternative baseload energy supply available. Most of the climate change spruikers in Australia are not really serious about the subject. It's mostly gesture, moral grandstanding and party politics. We have not even the scent of a serious discussion of nuclear power in Australia.

Consider, then, foreign policy. India is surely the third or fourth most important nation in the world to Australia. In recent years, it has often been our fastest-growing export market. It is the natural Asian balancer of China and it is the world's biggest democracy. Yet, alone among uranium suppliers on the face of the planet, we will not sell uranium to India, even as we sell it to China. It is irrational policy and everyone knows it, and it costs us dearly in our relationship with India.

Which brings us to defence and nuclear submarines. This week, the Gillard government's Defence Minister, Stephen Smith, announced, among other things, a new inquiry into the Collins-class subs and why very often only one out of six of them is available.

## **5. Unproven technologies a poor power option**

Martin Nicholson; The Australian, 27 July 2011

<http://www.theaustralian.com.au/news/opinion/unproven-technologies-a-poor-power-option/story-e6frq6zo-1226102319560>

A CLOSER look at the carbon price Treasury modelling released last week reveals some worrying analysis about our future electricity supply.

Two scenarios were modelled, one called "medium" and the other "ambitious". The medium (or "core") scenario, if adopted worldwide, aims to stabilise greenhouse gas concentration levels at 550 parts per million, the ambitious (or "high price") scenario at 450ppm.

At Copenhagen in 2009, the global community agreed any temperature increase needed to be held to below 2C above pre-industrial levels. This was further ratified at Cancun late last year. Treasury agrees that to have a 50 per cent chance of achieving the 2C global goal we need to stabilise at 450ppm so we need to implement the ambitious plan, not the medium plan. Yet much of the media reporting has been around the medium outcomes in 2050, not the ambitious ones.

To discuss what is worrying about Australia's future electricity sector plans, we need to consider what the world and Australia is planning for 2050 in the so-called ambitious scenario.

According to Treasury, global electricity sector technologies in 2050 will comprise 36 per cent renewables (mainly hydro, wind, solar and biomass), 32 per cent nuclear, 26 per cent carbon capture and storage and 6 per cent fossil fuels (without CCS).

Because the Treasury modelling did not include nuclear for Australia, our mix is somewhat different from the global mix. Fifty-one per cent of our electricity in 2050 will come from renewables, 26 per cent from gas using CCS, 18 per cent from gas and oil without CCS and 5 per cent from coal with CCS. This mix still requires us to purchase 25 per cent of our emissions abatement from overseas to achieve our 80 per cent reduction target.

Note that the 40 per cent renewables discussed by Julia Gillard on ABC1's Q&A program was from the medium or core plan, not the ambitious plan. Perhaps as implied by the name, Treasury (and the Prime Minister) already consider the ambitious plan unachievable.

We need to drill down further into the Australia technology mix to assess just how ambitious this plan may be.

The 51 per cent of electricity from renewables comprises 21 per cent hot rock geothermal, 18 per cent wind, 5 per cent solar, 4 per cent hydro and 3 per cent biomass.

The difficulties become apparent when we realise that hot rock geothermal and CCS are still unproved technologies on a commercial scale. So the ambitious plan calls for almost half of our electricity in 2050 to come from, as yet, unproven technologies. Ambitious indeed.

In case anyone is thinking that 2050 is a long way away and there is plenty of time to prove up these technologies or get new breakthroughs, it's worth looking at what electricity-generating technologies were around four decades ago.

By 1972, we had several proven electricity technologies using coal, wood, oil, gas, nuclear, hydro, conventional geothermal (using naturally occurring reservoirs of very hot water or steam), wind, solar photovoltaic and tidal power. These are all now considered mature technologies with possible incremental improvements yet to come.

Forty years ago there was a small demonstration hot rock geothermal plant in the US and a concentrated solar-steam electricity plant in Italy. After 40 years of development, these two technologies are still not delivering cost-effective power on a large scale anywhere in the world.

At that time, no one seriously considered carbon capture and storage for power plants; the technology is still less than 10 years old. If we haven't managed to prove up commercial-scale electricity generation from hot rocks or solar thermal after 40 years, what makes us so confident about CCS?

Given the above brief history, is it wise contingency planning to expect that half our electricity in 2050 will be coming from unproven technologies? Past history may suggest that the proven technologies we have may be all we can rely on.

The invisible elephant in the room of this Treasury report is the one low-emission technology that has been proven for more than 40 years and is still undergoing significant further improvement: nuclear energy. If it's good enough for most of the rest of the world, why not Australia?

Without nuclear power, we will be taking a gamble on technology development and increasing our electricity costs unnecessarily. The Treasury modelling shows that under the high price scenario described above, the average wholesale electricity price in Australia could rise to almost \$200 a

megawatt hour in today's dollar terms. The US Department of Energy predicts new advanced nuclear plants will be running at about half that cost by 2016.

We have an electricity plan for 2050 that unnecessarily relies on unproven technology while paying a substantial premium for the pleasure. Other countries, including China, do not. Surely we can do better than this?

Martin Nicholson is the author of *Energy in a Changing Climate* and *The Power Makers' Challenge* (to be released next year).

## **6. Forests 'the key to reducing carbon emissions'**

Graham Lloyd, Environment Editor, *The Australian*, 15 July 2011

<http://www.theaustralian.com.au/national-affairs/carbon-plan/forests-the-key-to-reducing-carbon-emissions/story-fn99tjf2-1226094943090>

LONG understood to be the lungs of the earth, the world's great forests are much more important in the carbon cycle than was previously believed, soaking up one-third of all fossil fuel emissions, according to new research.

Standing forests remove 2.4 billion tonnes of carbon a year from the atmosphere, almost five times Australia's total emissions.

On the other side of the carbon ledger, forest logging releases about 10 billion tonnes of CO<sub>2</sub> into the atmosphere each year.

The research, published today in the leading journal, *Science*, estimates that reducing logging, most notably in Indonesia and Brazil, could yield up to 2.9 billion tonnes of CO<sub>2</sub> a year to be traded as carbon permits to offset emissions in developed countries.

The findings underpin global efforts to establish an avoided deforestation scheme, known as Reduced Emissions from Deforestation and Degradation, in the developing world.

They also underpin demands in Australia that some of the \$1 billion biodiversity fund established as part of the federal government's carbon tax plan be used to stop logging in state forests.

CSIRO scientist and co-author of the paper, "A Large and Persistent Carbon Sink in the World's Forests", Pep Canadell, said research proved forests should become a priority in any climate protection strategy.

The study showed "the capacity of forests to make a difference for climate protection is much bigger than we thought", Dr Canadell said. "This is because the emission flux from cutting the trees down and releasing the carbon into the air is two to three times what we had been saying in the past."

The research has been undertaken as part of the Australian Climate Change Science Program, funded jointly by the Department of Climate Change and Energy Efficiency, the Bureau of Meteorology and the CSIRO.

Dr Canadell said the research showed the amount of carbon available in avoided deforestation schemes was much larger than previously thought.

Forest groups in Australia have long called for the inclusion of state forests in the nation's carbon account. According to the Australian Forest and Climate Alliance, state forest logging in Tasmania, Victoria and NSW contributes an estimated 10 per cent of Australia's emissions total.

Wilderness Society national campaign director Lyndon Schneiders said recognising the carbon potential of forests was a "game changer".

"The combined values of carbon sinks, biodiversity and ecological services, such as clean water, provided by forests make it imperative that urgent steps are taken to conserve what's left," Mr Schneiders said.

Dr Canadell said forest management was an issue for individual governments. For developing countries, he said, the research suggested the benefits of avoiding deforestation through the UN-backed REDD scheme were larger than previously appreciated.

Dr Canadell said a surprising finding was the large capacity of tropical forest regrowth to remove atmospheric CO<sub>2</sub>.

## **7. Sceptical Greens reject CSG 'quick fix'**

Matthew Franklin, The Australian, 17 Aug 2011

<http://theaustralian.newspaperdirect.com/epaper/viewer.aspx>

THE Greens have rejected longterm investment in the use of coalseam gas to generate electricity, questioning the widely held assumption that it produces lower carbon emissions than coal.

Only months after backing Julia Gillard's carbon tax and its supporting Treasury assumption of a 200 per cent increase in the use of gas-fired energy by 2050, Greens deputy leader Christine Milne said yesterday that the nation should "move straight to renewables".

As fellow Greens senator Sarah Hanson-Young described CSG as a quick fix, Senator Milne challenged the government to produce research to back the claim that coal-seam gas-fired power produced less carbon than coal. Her comments came as West Australian Premier Colin Barnett said Australia could avoid the need for a carbon tax if it decided that half of all new electricity generation be fired by gas.

Noting his state had a century's worth of gas supplies to fuel its lucrative liquefied natural gas export industry, Mr Barnett said people should ask why the country was not using more gas. Independent MP Tony Windsor will introduce a private member's bill into parliament on Monday which could allow the commonwealth to override the states and impose limits on CSG development.

Mr Windsor said his bill would "arrest the forward progress" of CSG extraction by imposing development restrictions on prime agricultural land and regions rich in ground water. "If there's risks there, don't take them," he told the ABC's Lateline program. "If you don't know the scientific realities of the relationship between coal-seam gas and ground water and the mixing of aquifers, then maybe you shouldn't go there in the first place." Mr Windsor said he saw the bill as a key test for the Labor government, but would not withdraw support for Julia Gillard if she declined to back his legislation.

Yesterday's debate came amid concern about the development of coal-seam gas wells in rural areas. The Greens are working on legislation that would protect the rights of farmers to refuse to allow prospecting on their property and ban new CSG drilling until more research is done into its effects on underground water supplies.

Yesterday, Senator Milne made clear her party saw gas "at the maximum as a bridging fuel". She asked Labor to provide evidence of the wisdom of using CSG. She argued no work had been done in Australia on whether coalseam gas was less greenhouse intensive than coal given the fugitive emissions from drills and leaking pipes, and costs in transport, processing it and then shipping it overseas.

Finance Minister Penny Wong said the government saw liquefied natural gas as a critical industry. "The government does see LNG as a cleaner-burning fuel and an essential part of the global solution to reduce greenhouse gas emissions," she said. Earlier, Mr Barnett told ABC radio that if half of all new electricity generation in Australia were powered by natural gas, there would be no need for a carbon tax.

## **8. Methane rise blocked by less irrigation, more natural gas**

Graham Lloyd, Environment editor, The Australian, 12 August 2011

<http://www.theaustralian.com.au/national-affairs/climate/methane-rise-blocked-by-less-irrigation-more-natural-gas/story-e6frg6xf-1226113384777>

THE increased use of natural gas for heating and electricity generation, and reduced flood irrigation for rice-growing in China are believed to be responsible for a two-decade pause in the level of the potent greenhouse gas methane in the atmosphere.

A stable methane level at 1.8 parts per billion has been good news in terms of climate change but it is not enough to explain the slowing of global temperature rises over the past decade, accounting for a cooling impact of 1/100 of a degree.

This slowing trend, according to the latest published reports, is because of increased sulphur dioxide emissions from Chinese coal-fired power stations and below-average solar activity.

Two papers published in Nature journal this week tried to explain why the rapid rise in atmospheric methane levels of the mid-20th century gradually levelled off around the turn of the millennium.

One paper measured the difference in the concentration and isotopic signature of methane between the hemispheres and concluded that reduced microbial activity in wetlands was primarily responsible.

It found the reduced use of flood irrigation seemed to explain about half of the northern hemispheric trend.

Another paper combined measurements of methane trapped in Antarctic ice with a simple atmospheric model and concluded that the slowdown was caused by reduced methane emissions from fossil-fuel production.

Although different, the findings are not considered mutually exclusive.

Methane makes up 1.8 parts per billion of Earth's atmosphere compared with 380 parts per billion for carbon dioxide.

But methane is 25 times more powerful as a greenhouse gas than CO<sub>2</sub>, meaning every kilogram of methane in the atmosphere has the same impact as 25kg of CO<sub>2</sub>.

According to Paul Fraser, chief research scientist at the CSIRO's Centre for Australian Weather and Climate Research, over the past 100 years methane has been responsible for about 10 to 15 per cent of the man-made pressures on climate change.

Methane occurs naturally from wetlands and swamps and is produced in agriculture from flood irrigation and burping livestock.

It is also a by-product of fossil fuel production and leaking from gas reticulation systems.

"It has been a long-held view that the rate of growth of methane peaked in the 1960s and has since declined," Dr Fraser said. "The rise coincided with the massive release of methane in the 1960s from the great acceleration in the search for oil at a time when methane was seen as a waste product and flared into the atmosphere.

"Over the last two decades, fuel companies recognised its value and developed the technology to capture it and sell it as natural gas."

In the late 1990s to mid-2000s, methane in the atmosphere reduced to the point of balance whereby all methane emissions were being taken up by natural processes such as oxidisation in the atmosphere and biological processes in dry soils.

## **9. Coal-seam gas better for the atmosphere, but it's not a cure-all**

Matt Chambers, The Australian, 19 August 2011

<http://www.theaustralian.com.au/national-affairs/coal-seam-gas-better-for-the-atmosphere-but-its-not-a-cure-all/story-fn59niix-1226117730932>

THE good thing about coal-seam gas, from a greenhouse gas perspective, is that it contains no embedded carbon dioxide, unlike the nation's gas reserves off Australia's northwest coast and in South Australia's Cooper Basin.

A negative, and what Greens leader Bob Brown has latched on to, is that CSG can require thousands more wells to be drilled to get out the same amount of gas.

This means more carbon is emitted when drilling and producing the gas.

And there is the risk that the gas - which is essentially methane - will escape into the atmosphere before it is burned to provide electricity.

This last factor is the source of the fugitive gas emissions Senator Brown has been referring to in opposing CSG projects.

Recent studies appear to show the positives and negatives balance each other out, leaving power produced from traditional gas and CSG producing about the same emissions - about 500kg of carbon dioxide per megawatt hour.

And both produce a lot less than black or brown coal, which can let off up to 1.4 tonnes of carbon dioxide per megawatt hour.

Until recently, conventional gas from onshore and offshore fields provided all the nation's gas for houses, power plants and liquefied natural gas exports.

Extracting the gas normally requires only a few big wells to be drilled. And carbon dioxide is stripped from the output before it is piped or made into LNG and released into the atmosphere.

The CSG process requires a lot more wells to be drilled, water to be removed and sometimes uses underground fracturing.

Elaine Prior, an analyst at investment bank Citi, released a study this week that analysed the environmental impact statements of the big LNG plants, as well as industry group information on coal and gas.

Her findings back up industry claims that CSG plants produce between 50 and 60 per cent of the carbon emissions of black coal, when extraction, transport and power generation is included.

Ms Prior said 36 per cent of the emissions from the CSG burned in power plants and production came from production of the gas, processing and transport, versus just 7 per cent in coal-fired stations.

On the fugitive emissions, Citi went with industry assumptions that 0.1 per cent of the gas is lost when CSG is produced and converted to LNG for export.

But Ms Prior expressed some doubt that the gas emissions were well understood.

"The CSG projects appear to assume that minimal quantities of methane gas escape as fugitive emissions," she said.

"However, fugitives depend heavily on actual operating practices, including ship operations, and we are not yet convinced all these are well understood."

If the assumption of fugitive emissions was boosted to 1 per cent, Ms Prior said, there would be a worst-case scenario of 0.7 tonnes of carbon dioxide emissions per megawatt hour from CSG generation of electricity.