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UK 'complacent' on nuclear future

By Richard Black

Environment correspondent, BBC News

<http://www.bbc.co.uk/news/science-environment-15816823>

The UK government's lack of strategy on nuclear research threatens long-term electricity plans, says the House of Lords Science and Technology Committee.

The "complacent" UK invests far less in research than other nations, creating a skills gap and making the country a "niche player", its report concludes.

The committee says the current reactor programme is unlikely to be affected.

But on extending nuclear plans to meet 2050 climate targets, chair Lord Krebs said "there isn't a credible Plan A".

"It is though we're setting off on a long journey without a map, without a driver, and without anyone to fix the car if things go wrong," he told reporters at a briefing in London.

"We are in danger of placing ourselves in a position where we will be unable to ensure a safe and secure supply of nuclear energy up to 2050.

"Without action now, in our view, the government's nuclear energy policy simply lacks credibility."

As a matter of urgency, the committee urges the development of a research

and development strategy looking beyond 2025, and the establishment of a board drawn from academia, industry and government agencies to implement that strategy.

Part of the strategy should be to re-activate membership of the Generation Four International Forum, the body that is co-ordinating research on the next generation of reactors intended to be safer and more efficient than current designs.

Training gap

Companies such as EDF and E.on are working on plans to build about 10 new reactors with a collective capacity of 16GW by 2025.

But projections by the government and some independent agencies suggest that in order to meet longer-term climate targets cost-effectively, this will need to be doubled or tripled by 2050.

The UK is committed to cutting greenhouse gas emissions by 80% from 1990 levels by mid-century.

The committee says there is a serious danger of UK expertise being lost by this period, with the skilled workforce ageing and a lack of investment in training new people.

Lord Krebs suggested that the government, regulatory agencies and industry would find it hard to recruit trained and skilled Britons.

And relying on other countries to provide a talent pool was not a sensible strategy, he said, when there was likely to be international competition to secure skilled personnel.

"Even if government policy is what I refer to as the 'Argos catalogue' policy of buying it off the shelf from EDF or German suppliers, it's not the case that you can buy something off the shelf without having the capacity to understand what it is you're buying and what the safety and legacy issues are," he said.

"Because of the ageing profile of the workforce in nuclear research and development, that capacity will decline unless there is a step change in

investment and will."

Figures obtained by the committee suggest that UK spending on fission research is dwarfed not only by established nuclear powers such as Japan, South Korea and France, but also by countries such as Australia and Italy that do not have active nuclear power programmes.

In the financial year 2010-11, the UK research councils spent £149m on energy research, with just 4% of that - £6.5m - going on fission.

That is far less than the spend on nuclear fusion research, and a tiny fraction of the annual £2.8bn pricetag for cleaning up Sellafield and other sites with a hefty nuclear legacy.

'Vital' technology

A government spokesman said that nuclear energy "is, and will continue to be, vital to UK energy security and reducing emissions, as well as supporting thousands of jobs".

"That's why we're investing £540m in energy research through the research councils, which includes money for research and training related to nuclear fission," he said.

The £540m figure covers financial years 2011-12 to 2014-15, the current spending review period.

Professor Robin Grimes, director of the Imperial Centre for Nuclear Engineering at Imperial College London and a special adviser to the committee, said that investing in research could provide returns later on.

"Building reactors is an international process now - the days when one company built the station and handed over the keys have ended," he said.

"There is a British company manufacturing pumps for pressurised water reactors, Rolls-Royce is investing in heat exchangers; so we do have companies with intellectual property rights appropriate for this sector, and in the long term [investment] will generate jobs for the UK."

2. Progress, peril, at Fukushima nuclear plant

BY:
RICK WALLACE, TOKYO CORRESPONDENT
From:

The Australian November 14, 2011 12:00AM

<http://www.theaustralian.com.au/news/world/progress-peril-at-fukushima-nuclear-plant/story-e6frg6so-1226193943107>

JAPANESE authorities have told journalists visiting the stricken Fukushima nuclear plant for the first time since the disaster that dangers remain despite the stabilisation of the damaged reactors.

Authorities opened parts of the plant to inspection by a party of Japanese and foreign journalists on Saturday to convince the national and global communities that progress was being made.

Nuclear Disaster Minister Goshi Hosono also toured the plant, 250km north of Tokyo, where 1600 workers were busy on furthering decontamination and stabilisation efforts.

The March 11 tsunami cut cooling systems at the plant, prompting a series of explosions and meltdowns that sent radiation spewing into the sky, sea and soil. More than 100,000 people were displaced by the disaster, which has caused widespread contamination and food scares.

The chief of the plant, Masao Yoshida - who admitted he feared he and his staff would all die in the early stages of the crisis - said his team was now on track to achieve cold shutdown by year's end.

"From the data at the plant that I have seen, there is no doubt that the reactors have been stabilised," he said. "(However,) it is still dangerous to work. The reactors are finally at a level that you can go there, but this is still not a situation where regular people can go in."

Journalists were taken through the stricken plant on a bus and wore protective suits, gloves, radiation dosimeters and, at times, gas masks.

It is clear from the account of the one pool reporter allowed to visit the plant that the 3200 men working at the plant continue to face significant hardships and high radiation levels.

Radiation readings during the visit - which took attendees to the heart of the crippled plant in a bus - peaked at 300 microsieverts an hour. That's enough for someone to be exposed to about 2600mSV over the course of a year - more than 10 times the maximum allowable yearly exposure for workers at the plant.

Journalists said the No 1 reactor building - which was blown up in the disaster by a hydrogen explosion - had been covered by a new superstructure.

The reactor's No 3 building, the other one to suffer extensive damage from a hydrogen blast, remained a concrete skeleton, although cranes were removing rubble to prepare for capping this reactor with a superstructure.

Efforts at the plant still centre on decontaminating the vast quantities of water being pumped through the stricken reactors for cooling.

A team of specialists, working in a command centre shielded by sandbags, were marshalling the pumping and decontamination operations while other workers clad in protective gear were building extra tanks for storage.

More than 40,000 tonnes of water remain at the bottom of the reactor buildings.

The bus drove between the reactors and sea and reporters saw a 4m-high sea wall built with rocks in black nets plant operator the Tokyo Electric Power Company said was a makeshift defence against another tsunami.

TEPCO said all vital electronics and pumps for the new cooling system were 30m above the reactors, keeping them safely out of tsunami's reach - as opposed to March 11, when all sources of back-up power were swamped by the tsunami.

3. Nuclear energy back from the dead after Fukushima

November 16, 2011

OPINION

<http://www.theage.com.au/opinion/nuclear-energy-back-from-the-dead-after-fukushima-20111115-1nh70.html>

JOHN Howard didn't have Twitter to sell his bold call in 2007 to sell uranium to India - one of the last significant decisions of his prime ministership.

Julia Gillard spent a portion of yesterday on the popular social networking site explaining her broad rationale for coming to exactly the same view as Howard - just four years down the track.

When quizzed by journalists about the time lapse, Gillard explained it thus: if Labor had moved when it took office (instead of unpicking the Howard decision) it would have lacked perspective on critical international events, such as the bedding down of a bilateral co-operation agreement between the US and India.

Possibly. More likely it was viewed among supporters of policy change as more manageable to deal with reform on uranium exports in increments, given yellowcake always rends the Labor Party in two.

The fact Gillard is now advocating the Howard position owes much to the advocacy of the Resources Minister, Martin Ferguson, who agreed privately with Howard's direction back in 2007, viewing Australian sales to Delhi as sound policy, and all but inevitable given the Indians and Americans both wanted it.

Ferguson was the first of the government to go public with his view. In February, he told *The Age* India was not a rogue state; the uranium sales issue was a thorn in the bilateral relationship, and it must be fixed.

The nuclear crisis in Fukushima seemed to kill Ferguson's reform momentum earlier this year. But he, others in the government, and the broader labour movement persisted.

The Prime Minister was, in time, persuaded by the persistent advocacy by Ferguson and others - without a formal cabinet deliberation, and

with precious little internal consultation. And now the Labor conference will have its debate.

The right-wing conservative powerbroker union official Joe de Bruyn has been mollified by hastening very slowly on gay marriage and de Bruyn is on board with uranium exports to India.

The "shoppies" union boss expressed concerns about proliferation risks early this year, but told *The Age* yesterday his concerns had been assuaged.

Failing anything truly out of the box, with two big blocs on board - the Australian Workers Union, and the "shoppies" - the Right will carry the issue for Gillard at the national conference.

And the Left, cranky about being done over not just on uranium, but on gay marriage, will look to extract its price - not just in the hooting and the hollering and the theatrics that will happen in Sydney.

4. Freak weather a certainty, but IPCC report less sure on why

BY:
GRAHAM LLOYD
From:

The Australian November 21, 2011 12:00AM

<http://www.theaustralian.com.au/national-affairs/opinion/freak-weather-a-certainty-but-ipcc-report-less-sure-on-why/story-e6frgd0x-1226200588371>

THE candid conclusion from the Intergovernmental Panel on Climate Change's summary report into managing extreme weather events is that scientific understanding of global weather systems leaves a lot of scope for further research.

The report concedes that extreme events are rare, making it difficult to say with precision what changes have taken place or what to expect in the future. On human impact, the report concludes that "anthropogenic influences have led to warming of extreme daily minimum and maximum temperatures on the global scale".

And it says there is "medium confidence" that anthropogenic influences have contributed to intensification of extreme precipitation on the global scale.

The question of whether this has led to increased flooding is hotly contested. "There is low agreement in this evidence (regional flooding), and thus overall low confidence at the global scale regarding even the sign of these changes," the report says.

Given the central scientific thesis on climate change -- that increased atmospheric carbon dioxide will lead to rising global temperatures -- it would have been extraordinary had the report not forecast the prospect of more frequent heatwaves.

But what this actually means remains uncertain and will not become clear for decades.

The report dismisses the more exaggerated predictions of wholesale changes in the world's weather, saying; "There is low confidence in projections of changes in large-scale patterns of natural climate variability."

The bottom line is, even using a range of emissions scenarios, natural climate variability will dominate until mid-century.

"Even the sign of projected changes in some climate extremes over this timeframe is uncertain", it says.

Underscoring the poor level of scientific understanding, the report adds that "assigning 'low confidence' for projections of a specific extreme neither implies nor excludes the possibility of changes in this extreme".

The report says it is virtually certain that increases in the frequency and magnitude of warm daily temperature extremes and decreases in cold extremes will occur on the global scale during this century.

It is likely that the frequency of heavy precipitation or the proportion of total rainfall from heavy falls will increase this century over many areas of the globe.

Average tropical cyclone maximum wind speed is likely to increase but not in all ocean basins. And it is likely that the global frequency of tropical cyclones will either decrease or remain essentially unchanged over the next four decades.

The report says there is medium confidence that droughts will intensify in some seasons and areas, including southern Europe and the Mediterranean region, central Europe, central North America, Central America and Mexico, northeast Brazil, and southern Africa.

Elsewhere, however, there is overall low confidence because of inconsistent projections of drought changes.

And there is low confidence in observed trends in tornadoes and hail because of inadequacies in monitoring systems.

Not surprisingly, the report says there is high confidence that locations currently experiencing adverse impacts such as coastal erosion and inundation will continue to do so due to increasing sea levels, "all other contributing factors being equal".

The timing of the extreme weather report is significant because it deals directly with one of the central issues to be discussed at the IPCC's most important annual meetings, which starts in Durban in South Africa next Monday.

With negotiations for a binding international agreement to cut carbon emissions stalled, the IPCC is hoping to claim progress in the establishment of a multi-billion-dollar global fund to help the developing world cope with the impacts of climate change.

The findings of this report are not as pointed as some advocacy groups may have hoped. But the report does not lessen the case for better urban planning and infrastructure in the developing world.

The key finding is that rapid urbanisation and poor planning greatly increase the risk of costly damage from bad weather, whether it is caused by climate

change or not.

5. Great barrier relief: corals are tougher than expected

BY:

SARAH ELKS, NORTH QUEENSLAND CORRESPONDENT

From:

The Australian November 14, 2011 12:00AM

<http://www.theaustralian.com.au/news/nation/great-barrier-relief-corals-are-tougher-than-expected/story-e6frg6nf-1226194011120>

RESEARCHERS are discovering pockets of tough survivor corals around Australia, sparking hope reefs are more resilient to the devastating effects of climate change than feared.

On the southern Great Barrier Reef, quick-growing coral has survived bleaching caused by a spike in sea temperatures; off the Kimberley coastline, researchers are marvelling at the ability of the reef to adapt to warming waters; while a new Australian study reveals some coral can offset ocean acidification when surrounded by seagrass beds.

But despite the glimmers of hope, scientists say reefs are not adapting quickly enough to cope with the rate of climate change, and the forecast is still bleak.

University of Western Sydney biologist Anya Salih studies the reefs off Lord Howe Island and has discovered corals with high levels of fluorescent protein are less vulnerable to coral bleaching.

"This does show corals have some capacity to resist climate change," Dr Salih said, while noting that even those with the protein suffered.

"However . . . the predicted increases of temperature indicate they are likely to reach levels beyond the adaptive capacity of the more resilient corals."

Dr Salih said scientists were regularly observing the resilience of corals to extreme conditions.

"The question is not whether there are corals that are more resilient than others - there certainly are - but whether the speed of adaptation is fast enough to keep up with the rate of climate change," she said.

"Much of the evidence is showing it cannot."

Mass bleaching is caused when normal summer sea temperatures rise by more than one or two degrees for a sustained period, combined with direct sunlight.

Australian Museum coral biodiversity researcher Zoe Richards has observed first-hand how rapidly corals on remote Ashmore Reef, off Western Australia, recovered from significant bleachings in 1998 and 2003.

There, the percentage of hard coral on the seabed increased in four years from 10 per cent in 2005 to nearly 30 per cent in 2009, while the percentage cover of soft corals doubled over the same period.

"It was a rapid recovery and quite unexpected, given the reef's isolation," Dr Richards said.

But the ability of reefs to adapt and survive the effects of climate change was hindered by other man-made threats, such as overfishing and chemical runoff, Dr Richards said.

Snorkelling at Long Bommie on the Great Barrier Reef off Cairns, student Claudia Pudelko, 23, said it was imperative the reef was protected.

"It's very important, especially for Cairns, because the whole economy here is based on it," said Ms Pudelko, who moved from Germany to Australia in 2007 to work on a reef dive boat.

"Ninety per cent of my friends work in the tourism industry here, and they

6. Climate change effects unknown: IPCC report

<http://www.theaustralian.com.au/news/health-science/climate-change-effects-unknown->

GREAT uncertainty remains about how much of an impact climate change will have on future extreme weather events, the world's leading climate scientists have found.

While there has been an increase in warm days and a decrease in cold nights, the likely impact on future weather events would not be evident for decades because of natural variability, the scientists say in a key review prepared for the UN's Intergovernmental Panel on Climate Change.

The review of the global climate change literature, prepared as a prelude to the year's biggest climate change conference to be held in Durban in South Africa, says the rising global temperatures can be expected to have an impact.

But it adds: "Projected changes in climate extremes under different emissions scenarios generally do not strongly diverge in the coming two to three decades, but these signals are relatively small compared with natural climate variability over this timeframe.

"Even the sign of projected changes in some climate extremes over this timeframe is uncertain."

Releasing a summary of the review last night in Kampala, the Ugandan capital, lead author Thomas Stocker said extreme weather events were some of the most complex phenomena in nature to understand, simulate and predict.

The IPCC report expressed the level of uncertainty attached to future scenarios, Dr Stocker said. But for many phenomena, the picture was very clear and the physical relationship was well understood.

"A changing climate leads to changes in intensity and frequency, spatial extent, duration and timing of extreme weather and climate events, and can result in extreme weather and climate events," Dr Stocker said.

"An increase in the frequency and magnitude of warm daily temperature extremes will occur in the 21st century on a global scale. For high-emission scenarios of greenhouse gases, the incidence of hottest days will increase by a factor of four within the next 30 to 40 years and by a factor of 10 by the

end of the 21st century."

IPCC chairman Rajendra Pachauri said it was "very likely" there had been an overall decrease in cold days and nights and an increase in warm days and nights. He said there had clearly been "statistically significant" trends in heavy rain events in some regions.

However, Dr Pachauri said there had been "strong variations to the trend".

Dr Pachauri described the extreme weather report as "robust and balanced".

Global Warming Policy Foundation director Benny Peiser said the overall message was "there was not a strong empirical link between anthropogenic climate change and weather events".

"It is unlikely there will be one for 20 to 30 years," he said.

He said any suggestion that recent weather events could be directly linked to climate change went directly against the general scientific consensus.

Kathy McInnes, lead author of chapter three - Changes in Climate Extremes and their Impacts on the Natural Physical Environment - said a lot of uncertainty remained.

"Extreme events are by nature very rare so we don't have a lot of data that we can assess for a climate change signal," Dr McInnes said. "Depending on the type of extreme, there can be a lot of different contributing factors, some naturally occurring and other human activity that is not necessarily climate change."

Climate Change Minister Greg Combet last night welcomed the release of the summary document, which he said had found that Australia was projected to experience large increases in the number of days over 35C and 40C and an increase in heatwave duration.

"The scientific advice is clear," he said. "The risks of climate change to our economy, society and environment are serious and grow rapidly with each further increase in temperature. The government is working to reduce the severity of these impacts by reducing our carbon pollution as part of international efforts to tackle climate change, and adapting to the impacts that cannot be avoided."

More than 100 authors from around the world, including three Australians, contributed to preparation of the IPCC report.

7. Test of climate politics

BY:
GRAHAM LLOYD, ENVIRONMENT EDITOR

From:

The Australian November 19, 2011 12:00AM

<http://www.theaustralian.com.au/national-affairs/climate/test-of-climate-politics/story-e6frg6xf-1226199441010>

THERE has always been something peculiar about the UN climate change process, in which the world's top scientists investigate an issue but must negotiate the wording of their public findings with governments to ensure they pass the political test.

It has been happening again this week in the lead-up to the Intergovernmental Panel on Climate Change meeting in Durban, South Africa, which begins on Monday.

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8. Fresh round of hacked climate science emails leaked online

A file containing 5,000 emails has been made available in an apparent attempt to repeat the impact of 2009's similar release

Leo Hickman

guardian.co.uk, Tuesday 22 November 2011 15.29 GMT

<http://www.guardian.co.uk/environment/2011/nov/22/fresh-hacked-climate-science-emails>

A fresh tranche of private emails exchanged between leading climate scientists throughout the last decade was released online on Tuesday. The unauthorised publication is an apparent attempt to repeat the impact of a similar release of emails on the eve of the [Copenhagen climate summit](#) in late 2009.

The initial email dump was apparently timed to disrupt the Copenhagen climate talks. It prompted [three official inquiries in the UK](#) and two in the US into the working practices of climate scientists. Although these were critical of the scientists' handling of Freedom of Information Act requests and lack of openness they did not find fault with the climate change science they had produced.

Norfolk police have said the new set of emails is "of interest" to their investigation to find the perpetrator of the initial email release who has not yet been identified.

The emails appear to be genuine, but the University of East Anglia said the "sheer volume of material" meant it was not yet able to confirm that they were. One of the emailers, the climate scientist Prof Michael Mann, has confirmed that he believes they are his messages. The lack of any emails post-dating the 2009 release suggests that they were obtained at the same time, but held back. Their release now suggests they are intended to cause maximum impact before the upcoming [climate summit in Durban](#) which starts on Monday.

In the new release a 173MB zip file called "FOIA2011" containing more than 5,000 new emails, was made [available to download on a Russian server called Sinwt.ru](#) today. An anonymous entity calling themselves "FOIA" then posted a link to the file on at least four blogs popular with climate sceptics – [Watts Up With That](#), [Climate Audit](#), [TallBloke](#) and [The Air Vent](#). The same tactic was used in 2009 when the first 160MB batch of emails were released after being obtained – possibly illegally – from servers based at the University of East Anglia, where a number of the climate scientists involved were based.

One marked difference from the original 2009 release is that the person or persons responsible has included a message headed "background and context" which, for the first time, gives an insight into their motivations. Following some bullet-pointed quotes such as "Over 2.5 billion people live on less than \$2 a day" and, "Nations must invest \$37 trillion in energy technologies by 2030 to stabilise greenhouse gas emissions at sustainable levels," the message states:

"Today's decisions should be based on all the information we can get, not on hiding the decline. This archive contains some 5.000 emails picked from keyword searches. A few remarks and redactions are marked with triple

brackets. The rest, some 220.000, are encrypted for various reasons. We are not planning to publicly release the passphrase. We could not read every one, but tried to cover the most relevant topics."

The use of points instead of commas to mark the thousands when writing a number – highly unusual in both the UK or US – is sure to lead to speculation about the nationality of those responsible.

The message then includes a sample of cherry-picked quotes selected from a small handful of the emails focusing on apparent disagreements between the scientists, the workings of the Intergovernmental Panel on Climate Change, and attempts to block climate sceptics from securing documents from the scientists via freedom of information requests. Many of the same issues were highlighted in the 2009 release.

One of the most damaging claims in 2009 was that Prof Phil Jones, the head of the UEA's Climatic Research Institute had deleted emails to avoid FOI request. One of the reviews into the content of the emails, conducted by Sir Muir Russell, concluded that "emails might have been deleted in order to make them unavailable should a subsequent request be made for them" - something that Jones has denied. At the time CRU was coming under sustained pressure by an organised campaign to release information, which the scientists saw as distracting from their work.

The new emails include similar statements apparently made by the scientists about avoiding requests for information. In one email, which has not yet been specifically confirmed as genuine, Jones writes: "I've been told that IPCC [Intergovernmental Panel on Climate Change] is above national FOI Acts. One way to cover yourself and all those working in AR5 [the IPCC's fifth Assessment Report] would be to delete all emails at the end of the process".

In a statement, the University of East Anglia said: "While we have had only a limited opportunity to look at this latest post of 5,000 emails, we have no evidence of a recent breach of our systems. If genuine, (the sheer volume of material makes it impossible to confirm at present that they are all genuine) these emails have the appearance of having been held back after the theft of data and emails in 2009 to be released at a time designed to cause maximum disruption to the imminent international climate talks."

It continued: "As in 2009, extracts from emails have been taken completely

out of context. Following the previous release of emails scientists highlighted by the controversy have been vindicated by independent review, and claims that their science cannot or should not be trusted are entirely unsupported. They, the university and the wider research community have stood by the science throughout, and continue to do so."

Mann, director of the Earth System Science Centre at Penn State University, who is quoted in the batch of released emails described the release as "truly pathetic".

When asked if they were genuine, he said: "Well, they look like mine but I hardly see anything that appears damning at all, despite them having been taken out of context. I guess they had very little left to work with, having culled in the first round the emails that could most easily be taken out of context to try to make me look bad."

He said, the people behind the release were "agents doing the dirty bidding of the fossil fuel industry know they can't contest the fundamental science of human-caused climate change. So they have instead turned to smear, innuendo, criminal hacking of websites, and leaking out-of-context snippets of personal emails in their effort to try to confuse the public about the science and thereby forestall any action to combat this critical threat. Its right out of the tried-and-true playbook of climate change denial."

An ongoing investigation by Norfolk Police into the 2009 release of emails has so far failed to result in any charges or arrests. A spokesperson said: "We are aware of the release of the document cache. The contents will be of interest to our investigation which is ongoing."

9.

Safety reviews, not shutdowns, are ordered in the wake of Fukushima

David Kramer

[Physics Today](#) / [Volume 64](#) / [Issue 5](#) /

May 2011, page 18

http://physicstoday.org/resource/1/phtoad/v64/i5/p18_s1?bypassSSO=1

With the extent of the damage and contamination from the nuclear

disaster in Japan still unknown weeks afterward, implications for the hundreds of reactors operating around the world are similarly unclear. But as Japanese workers continued efforts to bring under control the four crippled reactors at the Fukushima Daiichi plant and the associated spent-fuel pools, other nations launched fresh safety assessments of their nuclear generating plants, even while reassuring their populations that a repeat of the sequence of events in Japan was highly unlikely. With a few exceptions, the closure of operating facilities, or even the abandonment of nuclear energy altogether, was not among the responses being considered.

The US reaction

In the US, home to the largest number of commercial reactors, the Nuclear Regulatory Commission assembled a task force of senior managers and former staff experts within days of the 11 March temblor and charged the group with assessing whether operating and safety procedures need to be changed. After its 90-day review, the task force will recommend possible formal changes to NRC regulations. Bill Borchardt, NRC executive director for operations, told a Senate hearing on 29 March that the commission has in recent years approved 20-year license extensions for more than half of the 104 operating US reactors. The Vermont Yankee plant, one of the 23 US units with the same GE Mark I boiling-water reactor (BWR) design as those damaged at Fukushima, was granted its extension on 21 March, just days after the accident. The Vermont reactor was commissioned in 1972 and, like other US plants, was initially licensed for 40 years.

Borchardt told members of the Energy and Natural Resources Committee that there is no reason to slow the relicensing process. Should a change to the design of a US plant be called for by lessons learned at Fukushima, he said, the NRC would, "without hesitation," order the change to be made outside the licensing process. Additional safety requirements at US nuclear plants should prevent a prolonged loss-of-coolant crisis like the one that arose at the Fukushima Daiichi reactors. Following 9/11, the NRC undertook a review of the spent-fuel pool vulnerability issue specific to BWRs. As a result, measures to

ensure that adequate water levels are maintained in the pools have been “greatly enhanced,” Borchardt said.

Other NRC requirements during the past 20 years have mitigated the likelihood of power blackouts and hydrogen buildup that caused the explosions and radiation leaks seen in the Japan BWRs. Those requirements included the installation of radiation-hardened vent systems to release containment pressure and better positioning of batteries and other key pieces of equipment that would have helped operators at Fukushima to safely regain control of the reactors in the hours after the earthquake and tsunami struck, Borchardt said.

In the House of Representatives, longtime nuclear foe Edward Markey (D-MA) introduced a bill on 29 March that would suspend NRC licensing and relicensing activities until the adoption of new safety measures that take into account lessons learned from Fukushima. “We should not wait for an American meltdown to beef up American nuclear safety measures,” Markey said. But Nuclear Energy Institute president Marvin Fertel, representing the nuclear industry, issued a statement calling the legislation unnecessary in view of the NRC’s safety reassessment process.

Markey’s bill would also require US reactors to have available 72 hours of backup battery power and a much larger supply of fuel for diesel generators. David Lochbaum, director of the nuclear safety project at the Union of Concerned Scientists, told the Senate hearing that 93% of US reactors have only enough battery capacity to operate controls and pumps for four hours in a blackout. Markey’s bill also would restrict the amount of spent fuel that reactor operators are allowed to keep in storage pools. Moving the spent fuel into dry casks after it has cooled for five years would reduce the number of fuel elements that could become exposed to the air during an accident that would lower the water levels, as apparently occurred at Fukushima, Lochbaum and Markey argued. But Anthony Pietrangelo, Nuclear Energy Institute senior vice president, argued that five-year-old spent fuel produces very little heat or toxicity relative to fresh spent fuel.

China

Within days of the Japan quake, Premier Wen Jiabao suspended the review process for new reactor projects in China. The country's nuclear safety authority then ordered safety reviews for each of China's 13 operating plants, to assess contingencies for floods, earthquakes, and other natural disasters and to evaluate the reliability of their emergency power supplies. But various Chinese officials quoted in the state-controlled media insisted that the country's ambitious nuclear expansion plan remains on track. According to *China Daily*, Sun Qin, president of the China National Nuclear Corp, said, "China will not change its policy in developing the nuclear power industry." His remarks came during a 24 March visit to the Qinshan nuclear power plant, China's first power reactor.

"The safety of China's nuclear power facilities is guaranteed, and China will not abandon its nuclear power plan for fear of slight risks," Tian Jiashu, director of two nuclear safety centers under the Ministry of Environmental Protection, told the *People's Daily*. Yu Zusheng, an official of the Ministry of Environmental Protection, told *China Economic Weekly* that China should increase the use of third-generation reactor designs, such as Westinghouse's AP1000. The new designs include passively safe systems that don't require water pumps to cool the core in an emergency shutdown.

Of the 61 reactors now under construction worldwide, 28 are located in China, according to the nation's energy administration. Another 50 reactors are planned for China, according to the World Nuclear Association (WNA), which means that approvals and financing or major funding commitments are in place and that commissioning is expected within 10 years. An additional 110 reactors are proposed for China within about 15 years, according to the WNA.

Europe

Several European leaders reached a consensus quickly on a need for international nuclear safety standards. French president Nicolas Sarkozy, on a 31 March visit to Tokyo, said he will invite the Group of

20 developed nations to Paris in May to discuss the matter. Few countries have a greater investment than France in the future of nuclear energy. Its 58 reactors produce more than three-quarters of the country's electricity needs—a greater proportion than any other nation. Also a net exporter of electricity, France sells more than €3 billion (\$4.3 billion) worth of power annually to its neighbors. And it is a major exporter of reactors and nuclear fuel and services, including reprocessing of spent fuel. The mostly state-owned Areva is the world's largest nuclear company.

European Union ministers met on 21 March and announced plans to carry out individual stress tests to measure the safety of the 143 operating reactors in EU member states. "Our first priority is to ensure that the highest standards are enforced in the European Union," Tamás Fellegi, the Hungarian minister who chaired the meeting, told reporters afterward. The voluntary tests should get under way by the end of the year and will assess seismic and flooding vulnerabilities, the adequacy of the reactor cooling and backup electric supply systems, and other factors. Neighboring non-EU countries that operate reactors will be invited to participate. Left unresolved, Fellegi acknowledged, is what action the EU will take in the event that a reactor fails its stress test. British Prime Minister David Cameron said the tests should be performed by "independent international regulators" and the results peer reviewed. German Chancellor Angela Merkel called for the results to be made public.

Noting that 14 of the EU's 27 member states have commercial nuclear plants, EU energy commissioner Günther Oettinger told reporters, "There are very few issues where national governments and parliaments have such a disparity of views as they do on nuclear energy." Italy, which closed the last of its four commercial reactors in 1990, had planned to build four new reactors, beginning in 2013. Now that plan has been delayed by at least a year as a result of the Japanese accident.

The German government has been considering whether to close its 17 reactors and abandon nuclear power. Within days of the quake,

German authorities ordered immediate shutdown of the nation's 7 oldest commercial reactors, all commissioned before 1980. Restart will be contingent on the outcome of safety reviews, which were also ordered for the 10 German reactors that continue to operate.

In the UK, the office of the chief nuclear inspector has begun a six-month safety review of the 19 British commercial reactors. Thirteen reactors are planned or proposed for the UK, where nuclear energy accounts for 18% of electricity output, according to the WNA. In 2006 the UK's Labour government set a new national policy aimed at encouraging nuclear growth.

On 28 March International Atomic Energy Agency director general Yukiya Amano announced the convening of a nuclear safety conference in Vienna on 20–24 June. The agenda will include assessment of the causes and consequences of the Fukushima disaster and strengthening of nuclear safety and accident response measures.

US environmentalists' reactions

Environmental organizations were generally restrained in reacting to the Fukushima accident. The Natural Resources Defense Council urged that the NRC suspend its consideration of license extensions for reactors in highly seismic areas and recommended that it review existing extensions for reactors in such locations. The group also called on President Obama to order an independent inquiry into the safety of all US reactors in view of the Japanese events. "Review of the implications of this disaster should not be limited to the NRC assessing the adequacy of its own previous rules and decisions," council president Frances Beinecke wrote in a letter to Obama. "This would be problematic for any entity, but is particularly the case for the NRC, which has long been seen as a weak regulator with insufficient independence from the industry it oversees."

Charles Ferguson, president of the Federation of American Scientists, urged Japan to reevaluate its growing reliance on nuclear power. The earthquake-prone nation had plans to increase its nuclear generation from about 30% of total electricity generation today to 41% in 2017,

and to as much as 50% by mid-century. Instead, Ferguson urged Japan to adopt policies to stimulate greater use of renewable energy sources.

The longer term

It is too early to tell just what the impact of Fukushima will be on the renaissance that nuclear advocates had hoped lay ahead for the industry. Just one of the 62 reactors under construction globally is in the US—the second unit at the Tennessee Valley Authority’s Watts Bar plant, whose completion is scheduled for 2013. Another 9 reactors are planned in the US, and 23 are proposed. President Obama has not altered his support for more nuclear power as one element of a plan to double the share of US electricity generated from “clean energy” sources to 80% by 2035. But the building of new reactors will depend on the level of public acceptance and the availability of financing. And the capital markets have long been leery of the high costs, frequent overruns, and regulatory uncertainties of nuclear compared with natural gas and coal generation.

To help overcome the financing crunch, Congress authorized, and the Department of Energy has been offering, loan guarantees to nuclear utilities. In the first such deal, \$8.3 billion in guarantees was provided to Southern Co last year for construction of an AP1000 reactor to be located at a nuclear plant near Waynesboro, Georgia. Approval from the NRC is anticipated for that project. President Obama in February asked Congress for authority to issue up to \$36 billion in nuclear loan guarantees. But even guaranteed financing isn’t always sufficient to seal a deal; last year Constellation Energy backed out of a joint venture to add a third reactor at its Calvert Cliffs plant in Maryland; company officials complained that the DOE’s fee of \$880 million to guarantee \$7.5 billion of debt was too high. That left the other partner, Électricité de France, which operates all French reactors, to pursue the project alone.

10. Energy future lurks where sun don't shine

BY:

ANDREW FRASER

From:

The Australian November 26, 2011 12:00AM

<http://www.theaustralian.com.au/news/health-science/energy-future-lurks-where-sun-dont-shine/story-e6frg8y6-1226206430096>

THERE are 300 days of sunshine each year at Villanueva del Rey in southern Spain, and it is driving the hopes and aspirations of advocates of sustainable energy not just in Europe but around the world.

In the fields outside Villanueva del Rey is the Gemasolar plant, billed as the world's first around-the-clock solar power plant, which consists of a concentric series of mirrors that focus energy on a central tower.

What sets this project apart from others is a molten-salt heat storage system capable of storing heat accumulated while the sun is shining for up to 15 hours after it goes down, making it the world's first solar power plant capable of producing energy 24 hours a day.

Renewable energy advocates are labelling it a "game-changer", as it directly counters the argument against total reliance on renewable energy - that it's not consistent, and that when the sun doesn't shine or the wind doesn't blow there's no energy. Various Australian politicians - including independent Tony Windsor - have made the pilgrimage to Spain to inspect the station.

It demonstrates that the technology can work under certain circumstances, but economics are against its immediate widespread introduction as a new way of providing baseload power. It costs about 18 times as much to produce energy from this installation as it does from a gas-fired power plant.

According to its website, the Gemasolar plant can provide power for 25,000 homes. But apparently Spanish consumers are more frugal than their Australian counterparts, as the standard Spanish home consumes 12 kilowatt hours daily, while Australians consume 20kW hours daily. Thus the 25,000 Spanish homes potentially powered by the \$300 million Gemasolar equate to 15,000 Australian homes.

Compare this with the gas-fired Darling Downs Power Station in southeast Queensland, Australia's largest and newest power station, operating for about a year. It cost \$780m, more than twice the cost of Gemasolar, but has

the capacity to service 400,000 households, more than 25 times as many people.

There is no doubt that more work on solar technology will bring down the price, while most of the efficiencies in gas production have already been made. But the comparison shows that the discovery of huge amounts of gas in various developed countries worldwide is likely to drive investment away from renewables and towards gas.

The argument is that gas is a "transitional" fuel, a sort of halfway house between high carbon-emitting but cheap coal and renewable yet expensive solar and wind. ACIL Tasman executive director Paul Balfe says coal emits 0.85 tonnes of carbon per megawatt hour of production, while gas emits 0.4 tonnes. Renewables, of course, emit nothing at all.

All this means that, internationally, gas is on a roll. In Australia, coal-seam gas is the major new energy source - the Darling Downs plant, for example, operated by Origin Energy, is fully powered by coal-seam gas. The \$50 billion investment in plants and infrastructure in Gladstone in central Queensland also relies on coal-seam gas.

But shale gas has made much larger inroads in the US and could do the same in Britain and parts of Europe, notably Poland.

The shale gas revolution in the past decade has come about through advances in two technologies: hydraulic fracturing (fracking), which breaks up shale and liberates gas, and horizontal drilling, or inserting a pipe directly from the surface downwards and then along a seam of shale.

Shale gas requires more fracking than coal-seam gas, because shale is a far tougher mineral than coal. But there have been claims that shale gas extraction is less environmentally intrusive, as it occurs at a deeper level. In purely economic terms, technological advances have turned the US in a decade from a net gas importer to an exporter. Ten years ago, the US built terminals to receive shiploads of gas from the Middle East and Africa, but they now sit idle, made redundant by production in American shale basins.

In 2009, the US surpassed Russia as the largest producer of natural gas, while shale gas production in the US has increased from almost nothing a decade ago to about 30 per cent of its natural-gas supply, and likely to be 50 per cent in the next few years. This has created more than 200,000 jobs, no

small boost at a time of mass unemployment in the US. More importantly, it has kept gas prices down while other energy prices are rising.

The environmental problems associated with the North American gas experience are well documented, not least in the film *Gasland*. But the US has a different system of land tenure than that of Britain and Australia. There, the owner of the land where the gas is extracted is deemed to be owner of the resource below that land, whereas in Australia minerals belong to the state. As a result, many farmers in the US who have had gas operations on their property are happier with the result - even if their farms are environmentally affected - because they are getting more money for the gas.

In Britain, the dash for gas has just started. Exploration company Cuadrilla, which is 41 per cent Australian-owned, claims to have discovered shale gas deposits that are 56 times Britain's annual gas needs, although, to be more realistic, only 10-20 per cent of that might be recoverable.

The exact nature of the claims has certainly had local impacts. In Lancashire, the company claims there is a reserve of 200 trillion cubic feet, which if correct would be the biggest reserve in the world and equivalent to 20 per cent of the whole of China's shale gas resource - the biggest in the world.

But protests similar to those in Australia against coal-seam gas are also being played out against shale gas in Britain. The government still has to work out how to respond, with British Energy Secretary Chris Huhne being in the hot seat. In addition to that role, he is Minister for Climate Change.

On the one hand, this is a possible solution to the political problem of rising domestic power bills, with the US experience a powerful example of how gas has kept power bills lower than they would otherwise have been. On the other hand, there is strong community feeling about the long-term effects of gas mining on farmland.

University of Manchester energy and climate change professor Kevin Anderson told *The Australian* last month that development of a cheap new energy source with half the carbon emissions of coal could make it politically difficult to continue subsidising the creation of a major renewable energy industry based largely on expensive offshore wind turbines.

"From a climate change perspective, we should be leaving new fossil fuels like this in the ground and pushing on with renewables, but that will be a whole lot harder if the claims about these shale gas reserves turn out to be true," he says. "Yes, gas is cleaner than coal, but it would not end up displacing coal; it would displace renewables. The coal would still be used somewhere and the renewables would not be built."

In Britain, the renewable energy source most under threat from the rise of gas is wind power, of which Britain is one of the largest producers worldwide.

Consider the scale of the British wind power industry. At the moment there are more than 3000 windmills around the UK, and plenty more in the pipeline, with another 2000 under construction while approval has been given for another 3000 and applications for 5000 more are awaiting approval.

In the next few years, it is possible that there will be 13,000 windmills dotted around the British countryside. The pace at which this industry is growing is causing the sort of social unease in Britain that the rapid expansion of the coal-seam gas industry is causing in Australia. Local protest groups against wind power have sprung up, largely along the west coast of Britain and particularly in Wales.

The sort of rhetoric being used - that local communities should have some sort of control over what's happening in their areas - is remarkably similar to that in Australia about coal-seam gas.

By contrast, Australia's wind-power industry is considerably smaller, with only 767 windmills installed. But, like Britain, it is on the cusp of massive expansion, largely in Victoria, where 2500 mills have been proposed, and South Australia, where about 2000 are on the drawing board.

Energy experts such as Grahame Baker, a senior adviser at Brisbane consultancy Resource and Land Management Services, say one of the big drawbacks to wind development is that it requires other power sources to supplement it, simply because wind is unpredictable.

"One of the big problems with wind is that when you need it most it's not there. People reach for their air-conditioners on hot, dry days, and most times that's precisely the times when there's no wind. The idea is that you

can use something like gas to fill in the gaps in power from wind so that you've got a constant supply," he says.

It is precisely this emerging area of hybrid energy that renewable energy advocates such as Matthew Wright of Beyond Zero Emissions see as likely to favour gas crowding out renewables.

"Wind is predictable in the long term - you know over the course of a year how much wind you're going to get in an area. But it's true that you don't know at the start of any one week just how much wind you're going to get in that week," he says.

He recognises that wind needs some "smoothing out" mechanism to provide constant, reliable power, but advocates that this role should be filled by solar rather than gas.

"If you use gas it's like putting lipstick on a pig - you can call it whatever you like, but it's still a pig. You can't claim that using gas with wind is a renewable technology, because it's not. Wind and gas are not compatible, it's as simple as that. Especially since you now have the possibility of baseload power once that sort of technology being used in Gemasolar becomes more available."

Wright sees the use of gas in hybrid technologies as the thin end of the wedge, a way that gas can keep a foothold in a rapidly changing energy landscape. He is especially critical of the use of gas in the federal government's flagship solar project at Chinchilla on the Darling Downs, not far from Origin Energy's gas-fired power station, for which Canberra is providing \$464m of the plant's cost of \$1.2bn through its Clean Energy Fund.

This area of the Downs, about 300km west of Brisbane, has almost all the types of energy production showcased. There is Kogan Creek, a coal-fired power station, the gas-fired Darling Downs Power Station, the underground coal gasification project of Linc Energy, which involves burning coal underground to create energy, and now the solar project.

Campaigners such as Wright are concerned, though, that the solar plant will not be emissions-free because it is using gas as a bridging power source. Worse, the gas is from coal seams.

"Why wouldn't you use the sort of technology that's being used at Gemasolar instead of having to rely on an unrenovable source of energy like gas?" he says. "We're stridently opposed to gas being used in this way. There's an opportunity for us to utilise new technology and we haven't taken it."

What especially sticks in his craw is that the central company in the consortium building this solar station is French company Areva, the world's largest nuclear energy group. "How can you have a nuclear group involved in a clean energy project?" he says.

But Areva's involvement in solar technology is typical of what is happening throughout the renewables sector, as major energy companies move in, not least because of carbon taxes. Origin Energy, for example, operates conventional and unconventional gas operations and is the biggest buyer of wind farm energy in Australia and has an interest, through a subsidiary, in wind farms in New Zealand.

Origin managing director Grant King made the point in a speech to the Committee for Economic Development of Australia that the cost of producing renewable energy is considerably higher than that of coal and gas, but the cost of renewables is coming down. In very broad terms, power from coal costs about \$60 per megawatt hour and gas \$70 per megawatt hour, while wind costs about \$110 per megawatt hour and the cheapest form of solar energy, photovoltaic, costs about \$230 per megawatt hour, with solar thermal about \$300 per megawatt hour.

But, Wright says, the costs of renewables are coming down while those of fossil fuels are static. Even the federal government, in work for its white paper on energy, concedes that the cost of generating energy through renewables will come down in absolute terms. Then, of course, the carbon tax will further bridge the price gap between gas and renewables.

"If you had to pick between the price trending down and the one standing still, which one would you pick?" Wright says.

Another problem facing renewables is only just starting to emerge, and it could be as big as the economic factor. That is community acceptance. In his speech to CEDA, King made the point that environmental groups, while fierce critics of fossil fuel production, remained silent on environmental problems associated with renewable energy. "We know from our own experience that community opposition to wind farm development in regional

Victoria, South Australia and southern NSW is just as strong as concerns expressed about CSG development in Queensland."

But this not-in-my-backyard criticism is present in all energy developments.

11. Rational approach on climate

From:

The Australian November 26, 2011 12:00AM

<http://www.theaustralian.com.au/news/opinion/rational-approach-on-climate/story-e6fgr71x-1226206485713>

THE second round of so-called Climategate email revelations has been released for maximum political effect, on the eve of the UN's Durban climate change conference. The timing indicates that those promoting climate scepticism have an eye for public relations and political management. But the emails themselves reveal, most clearly, the extent to which climate change scientists have been involved in the same game of spinning for their cause of global warming, and working towards greatest political impact.

This newspaper always supports a rational approach to climate science, accepting the scientific consensus that carbon dioxide emissions are warming the planet, and supporting market mechanisms to reduce emissions -- while favouring stringent analysis of alarmist claims. When climate activists from Al Gore to the local school teacher have implored us to "respect the science" we now know they have often been referring to a cleverly manipulated and exaggerated public impression of the science.

Scientists should be dedicated, even passionate, but by definition they need to be focused on empirical science, rational analysis and facts. By cherry-picking data -- promoting that which suits their cause and downplaying or ignoring that which doesn't -- scientists have been doing more than simply putting a gloss on their work. Some have conscripted their work into

advocacy to shape the public's views about climate. In the 5000 leaked emails there is a range of exchanges between scientists, from unsurprising professional rivalry to justifiable efforts to win publicity for projects. But it is clear that time and again they cross the line. A phrase such as "we're choosing the periods to show warming" cannot look benign in any context. Or an email suggesting data might be selected not on its merits but on its conclusions; "paper may be worth citing, if it does say that GW (global warming) is having an effect on TC (tropical cyclone) activity." There are references to "the cause" and notes such as "thanks for your paper and congratulations for reviving the global warming".

The latest Intergovernmental Panel on Climate Change summary report has demonstrated an increasingly rational and cautious approach to climate science. It had been embarrassed by mistakes in earlier reports, such as the erroneous claims that Himalayan glaciers would melt by 2035. Those revelations and the impact of the first Climategate leaks have encouraged more debate and greater intellectual integrity. Transparency, as a rule, is something this newspaper views as a guiding principle because it fosters open-mindedness in the contest of ideas. Yet we cannot fail to notice that some sections of the media that have worked themselves into an unquestioning lather over various WikiLeaks information dumps or even the minutia of the Hackgate inquiries in London have shown a strange lack of curiosity about the Climategate leaks -- even though they have provided a window into the science, politics and spin in the pre-eminent debate of our time. The ABC and Fairfax press might be embarrassed about how years of alarmist climate stories, and tokenistic gestures such as Earth Hour, might have fuelled the global warming hyperbole that has helped to create a sceptical backlash. There is no doubt such reporting has hurt the debate. The way to resolve that is not to avert their eyes, but to share the new information and encourage a rational approach.

12. Climate forecasts 'exaggerated': Science journal

BY:

AMOS AIKMAN

From:

The Australian November 25, 2011 1:59PM

<http://www.theaustralian.com.au/news/health-science/climate-forecasts-exaggerated-science-journal/story-e6frg8y6-1226205464958>

DRAMATIC forecasts of global warming resulting from a doubling of atmospheric carbon dioxide have been exaggerated, according to a peer-reviewed study by a team of international researchers.

In the study, published today in the leading journal *Science*, the researchers found that while rising levels of CO₂ would cause climate change, the most severe predictions - some of which were adopted by the UN's peak climate body in its seminal 2007 report - had been significantly overstated.

The authors used a novel approach based on modelling the effects of reduced CO₂ levels on climate, which they compared with proxy-records of conditions during the last glaciation, to infer the effects of doubling CO₂ levels.

They concluded that current worst-case scenarios for global warming were exaggerated.

"Now these very large changes (predicted for the coming decades) can be ruled out, and we have some room to breathe and time to figure out solutions to the problem," the study's lead author, Andreas Schmittner, an associate professor at Oregon State University, said.

Scientists have struggled for many years to understand how to quantify "climate sensitivity" - how Earth will respond to projected increases in atmospheric carbon dioxide.

In 2007, the UN's peak climate body, the Intergovernmental Panel on Climate Change, warned that a doubling of CO₂ from pre-industrial levels would warm the Earth's surface by an average of 2C to 4.5C, although some studies have claimed the impact could be 10C or higher.

Professor Schmittner said it had been very difficult to rule out these extreme "high-sensitivity" scenarios, which were very important for understanding risks associated with climate change.

The study found high-sensitivity models led to a "runaway effect" under

which the Earth would have been covered in ice during the last glacial maximum, about 20,000 years ago, when CO2 levels were much lower.

"Clearly that didn't happen, and that's why we are pretty confident that these high climate sensitivities can be ruled out," he said.

Professor Schmittner said taking his results literally, the IPCC's average or "expected" value of a 3C average temperature increase for a doubling of CO2 ought to be regarded as an upper limit.

"Many previous climate-sensitivity studies have looked at the past only from 1850 through to today, and not fully integrated paleoclimate data, especially on a global scale," he said. "If these paleoclimatic constraints apply to the future, as predicted by our model, the results imply less probability of extreme climatic change than previously thought."

However, he cautioned that extreme climate change could still occur in some areas.

Dave Griggs, a professor of sustainability at Monash University, said that while models such as the one used by Professor Schmittner and his team were "the only tool we have" to assess long-term climate variability, they were also inherently imperfect.

"We are already heading towards a doubling of CO2 concentrations, so if we're going to get an equilibrium change of 3C that's actually pretty serious," Professor Griggs said.

13. Climate change science highlights uncertainties

From:

[The Australian](#) November 22, 2011 12:00AM

<http://www.theaustralian.com.au/news/opinion/climate-change-science-highlights-uncertainties/story-e6frg71x-1226201768869>

FOR extremes in climate change we often need not look at thermometers and rain gauges, but rather to the various elements of the

global warming debate. Activists and politicians too often oscillate between those who deny any human impact on climate and those who deliberately engender alarm.

The reality has always resided somewhere in between, as the summary report on extreme weather from the Intergovernmental Panel on Climate Change now makes clear. The report is certain about just two things: the consensus view that increasing atmospheric carbon dioxide from human activity is warming the planet, and that the trends and impacts of this are largely uncertain.

Proponents of climate change action have long argued that we should all "respect the science" and The Australian, which has consistently favoured a market mechanism to reduce carbon emissions, could not agree more. It is the science that needs to be respected and debated, not the emotional posturing of the climate change prophets of doom. The summary IPCC report finds that because of the rarity of extreme weather events, and the other natural variables of weather and climate involved, it will be decades before we can identify a discernible impact from global warming. It found, naturally enough, that we are likely to see more records broken at the warm end of the spectrum than the cool. But it also found that natural climate variability was likely to be more influential over weather patterns for the next four decades or more.

On that basis the path forward seems obvious; we need cautious measures to reduce emissions, coupled with a strong push for global co-operation, and there must be a continuing focus on scientific research. The practicalities of adapting our practices and economies to a changing environment ought to be a significant part of the debate. This is the sort of sensible approach this newspaper has always advocated.

The language of uncertainty that is littered throughout the IPCC summary supports this rational approach. And it throws the spotlight onto those who have drawn attention to themselves or their cause through emotional or dogmatic language. Former US vice-president Al Gore has probably been the worst offender with his proselytising about the "terrible catastrophes" that global warming has in store. His documentary *An Inconvenient Truth* had a significant impact on the international debate, but he has had plenty of willing accomplices. Prominent among them have been Australia's own

Greens leader Bob Brown and the man Julia Gillard appointed as Chief Climate Change Commissioner, the palaeontologist Tim Flannery. Professor Flannery has issued a range of hysterical warnings, including about rising sea levels: "Anyone with a coastal view from their bedroom window, or their kitchen window, or wherever, is likely to lose their house as a result of that change, so anywhere, any coastal cities, coastal areas, are in grave danger." When Australia was suffering severe drought a few years ago, he suggested Brisbane, Sydney and Adelaide would soon run out of water and that we should "stop worrying about 'the drought' - which is transient - and start talking about the new climate". He said the Arctic ice-cap could be gone by the year after next.

Senator Brown has used disasters to push his political views. In the wake of this year's Queensland floods, which took 35 lives and inflicted enormous economic damage, he suggested the "coal barons" should foot the bill. "Burning coal is a major cause of global warming," he said. "This industry, which is 75 per cent owned outside Australia, should help pay the cost of the predicted more severe and more frequent floods, droughts and bushfires in coming decades." Two years earlier, as the nation weathered the aftermath of the Victorian bushfires that took 173 lives, Senator Brown said it underlined the need for climate action: "Global warming is predicted to make this sort of event happen 25 per cent, 50 per cent more," he said.

The IPCC summary report will do the global warming cause a great deal of good if its frank assessment of the uncertainties of climate science helps to eliminate emotional and political exaggerations from public debate. It talks, for instance, about medium confidence that anthropogenic influences have led to some regions experiencing more frequent and intense droughts, but notes that some regions have experienced less frequent and shorter dry spells. It suggests medium confidence that extreme rainfall events have increased, and says it is likely coastal inundations have increased due to higher mean sea levels, but it has low confidence about any changes to tropical cyclone activity.

A dispassionate policy-maker reading the summary would deduce that we should be acting to reduce carbon emissions because we expect our emissions to lead to an increase in global temperatures. However, the variability of the data and modelling about the most likely scale of the impact should lead us to adopt a cautious approach, rather than one founded on panic. And especially with prospects for a new global agreement at

Durban later this month looking so slim, Australia must not take steps that do us economic harm for no environmental benefit. In all eventualities, regardless of the posturing, we should heed the science.

14. Anthony Pratt seeks \$300m from government to flick switch on waste-to-power scheme

BY:
DAMON KITNEY
From:

The Australian November 23, 2011 12:00AM

<http://www.theaustralian.com.au/business/companies/pratt-seeks-300m-from-government-to-flick-switch-on-waste-to-power-scheme/story-fn91v9q3-1226202997221>

THE Pratt family's \$3 billion Visy paper, packaging and recycling empire is seeking federal government support to help bankroll a revolutionary \$300 million project to turn household garbage into energy that would generate 3000 jobs across the economy.

The project would involve construction of a \$200m waste-to-energy plant, the first of its type in Australia, designed to generate 75 megawatts of electricity that would be sold into the electricity grid or directly to third parties.

Fuel for the plant would come from waste transfer stations or landfill sites in capital cities, where Visy is planning to spend \$100m to build a number of so-called pellet plants to shrink garbage into fuel for the waste-to-energy facility.

The garbage will be dehydrated to the size of a cork, which has the burn value of low-grade coal, and then fed into the clean energy plant to turn into energy.

Visy is seeking \$100m for the project from the Australian Renewable Energy Agency, or ARENA, the new independent statutory body established to provide financing assistance for projects that strengthen renewable energy and energy efficiency technologies.

"This will be a very big leap from anything we have ever done," Visy executive chairman Anthony Pratt said in an interview with The Australian.

"It is not completely new in the sense it is being done in dribs and drabs around the world. But no one has put it together quite this way before. So it would be a big project of national importance. That is why we think it would qualify (for assistance)."

In recent weeks, Mr Pratt has been briefing ministers in Canberra on the project, including federal Industry Minister Kim Carr and Resources and Energy Minister Martin Ferguson. NSW Premier Barry O'Farrell, Queensland Premier Anna Bligh and Tony Abbott have also received briefings.

Julia Gillard is this weekend due to open Visy's first waste-to-energy plant at its Coolaroo manufacturing and recycling plant in Melbourne. The event is expected to be attended by more than 2000 people.

The Coolaroo energy-from-waste plant will reduce Visy's emissions by 70,000 tonnes a year and divert 100,000 tonnes of waste that was going to landfill. It will reduce 50 per cent of the gas used at the manufacturing and recycling plant and 10 per cent of the energy consumption.

Mr Pratt's plans follow his commitment four years ago to invest \$US1bn (\$1.01bn) in paper recycling and waste-to-energy infrastructure at a Clinton Global Initiative meeting in New York.

Last year, Visy's US associate, Pratt Industries, commissioned a \$US60m energy plant in Georgia that converts waste from its manufacturing into gas.

The new waste-to-energy plant in Australia, which is likely to be located adjacent to Visy's Tumut pulp and paper mill in southern NSW, would be three times the size of the US facility. It will provide baseload power, unlike other renewable energy technologies such as solar or wind power.

While there are expected to be questions about emissions from the plant and

the potential for it to be viewed as a form of incinerator, Mr Pratt said they were much lower than from coal. The associated reductions on landfill would also contribute to lower greenhouse emissions.

The Obama administration provided \$US18.5m towards the \$US60m capital cost of the Conyers plant in the US.

Mr Pratt said an Australian government grant "would not make a difference as to whether we do it or not". However, it would bring forward Visy's ability to do it by "a number of years".

"A grant would help bring it to fruition a lot faster," he said.

Asked when the project could start with government funding, Mr Pratt replied: "Right here, right now. Automatically.

"It will create about 3000 jobs."

ARENA's board will manage \$1.5bn in committed funding and \$1.7bn in uncommitted funds to disburse for projects. ARENA will also receive future funding from discretionary dividends paid by the Clean Energy Finance Corporation and a share of revenue from the carbon tax. The first grants are due to be dispersed next year.

Visy is also setting up a contracting business, Build Run Repair, which will be a team of people charged with building and maintaining the plants.

Mr Pratt said Visy was considering establishing three or four pellet plants - three in NSW and one in Brisbane at Gibson Island - to supply the waste-to-energy plant. It would also consider selling the pellets to coal-fired power stations as an alternative fuel additive, to reduce emissions.

"What makes this different is that this is a step up in complexity in that no one in Australia and few around the world have been able to do: to turn municipal solid waste - real garbage - into energy," Mr Pratt said. "So this would be a first for Australia to be able to do that, at really big scale.

"The three things going for that are obviously, with the carbon tax, it would be a way to adapt to that. Secondly, landfill fees are going up a lot so it helps with that. And thirdly electricity rates are going up. So for all those reasons we think that would be interesting for coal-fired power plants to buy."

There are similar plants in Canada, Finland and the US, but they are at the pilot stage.

"My grandfather started Visy as a box manufacturer back in 1948," Mr Pratt said. "My father integrated the company back into paper mills. This is the next integration into what feeds the mills and that is energy. It's part of the same supply chain and part of the next evolution."

15. Europe's \$287bn carbon 'waste': UBS report

BY:
SID MAHER
From:

The Australian November 23, 2011 12:00AM

<http://www.theaustralian.com.au/national-affairs/europes-287bn-carbon-waste-ubs-report/story-fn59niix-1226203068972>

SWISS banking giant UBS says the European Union's emissions trading scheme has cost the continent's consumers \$287 billion for "almost zero impact" on cutting carbon emissions, and has warned that the EU's carbon pricing market is on the verge of a crash next year.

In a damning report to clients, UBS Investment Research said that had the 210bn the European ETS had cost consumers been used in a targeted approach to replace the EU's dirtiest power plants, emissions could have been reduced by 43 per cent "instead of almost zero impact on the back of emissions trading".

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16. Greenhouse gases rise to

record high

<http://www.news.com.au/breaking-news/greenhouse-gases-rise-to-record-high/story-e6frfku0-1226201925170>

THE amount of global warming-causing greenhouse gases in the atmosphere rose to a new high in 2010, and the rate of increase has accelerated, the UN weather agency says.

Levels of carbon dioxide - a greenhouse gas and major contributor to climate change - rose by 2.3 parts per million between 2009 and 2010, higher than the average for the past decade of two parts per million, a new report by the World Meteorological Organisation has found.

"The atmospheric burden of greenhouse gases due to human activities has yet again reached record levels since pre-industrial time," said WMO Secretary-General Michel Jarraud.

Greenhouse gases trap radiation within the earth's atmosphere, causing it to warm. The last two decades have seen a 29 per cent increase in radiative forcing - the warming effect - from greenhouse gases, the report said.

Scientists attributed the continuing rise in levels of carbon dioxide, which contributes about 64 percent to climate warming, to fossil fuel burning, deforestation and changes in land use.

Methane, produced by cattle-rearing and landfills, is the second most important greenhouse gas after carbon dioxide, followed by nitrous oxide.

The WMO's annual Greenhouse Gas Bulletin said methane levels rose five parts per billion or 0.28 per cent in 2009-2010 after a period of relative stabilisation from 1999 to 2006, possibly due to the thawing of the Northern permafrost and increased emissions from tropical wetlands.

Nitrous oxide, emitted into the atmosphere from natural and man-made sources, including biomass burning and fertiliser use, rose 0.8 parts per billion to 323.2 in 2010 - 20 per cent higher than in the pre-industrial era, defined as the period before 1750.

Its impact on the climate over a 100-year period was said to be 298 times greater than equal emissions of carbon dioxide.

"Even if we managed to halt our greenhouse gas emissions today - and this is far from the case - they would continue to linger in the atmosphere for decades to come and so continue to affect the delicate balance of our living planet and our climate," said Jarraud.

"Now more than ever before, we need to understand the complex, and sometimes unexpected, interactions between greenhouse gases in the atmosphere, Earth's biosphere and oceans."

The seventh Greenhouse Gas Bulletin comes ahead of a new round of UN climate talks in South Africa next Monday, testing global resolve to tackle what scientists warn is a time bomb with an ever-shorter fuse.

Analysts say the UN process is still traumatised by the near-collapse of the 2009 Copenhagen Summit and, in Durban, faces a bust-up over the Kyoto Protocol, the only agreement setting legal curbs on greenhouse gases.

Data from the US Department of Energy, released earlier this month, showed carbon emissions from burning fossil fuels made their biggest ever annual jump in 2010, led by China, the United States and India.

17. **"Record-setting" global warming change in Arctic**

Monday, 5 December 2011

Agence France-Presse

<http://www.cosmosmagazine.com/node/5047>

WASHINGTON: An unprecedented change in the Arctic linked to global warming has been found by an international team of 121 scientists, including melting ice, warming waters and changing wind patterns.

According to the 2011 Arctic Report Card, compiled by scientists from 14 countries, there is evidence to show that significant changes are occurring throughout the Arctic environmental system.

"Given the projection of continued global warming, it is very likely that major Arctic changes will continue in years to come, with increasing climatic, biological and social impacts," said the report.

Results of global warming report

The authors of the annual report - first released in 2006 - said there is now sufficient data to indicate a "persistent decline in the thickness and summer extent of the sea ice cover, and a warmer, fresher upper ocean".

Average temperatures over much of the Arctic have risen some 1.5 degrees C from a 1981 to 2010 baseline, and the minimum area of sea ice recorded this year, in September 2011, was the second lowest since 1979.

The researchers say that ozone concentrations in the Arctic stratosphere during March 2011 were the lowest ever recorded during the period beginning in 1979, which could be linked to recent changes in wind patterns. "While the global increase of human sources of greenhouse gases continues, there is no direct evidence that Arctic emissions of methane are changing," they said.

Pros and cons for wildlife

The "profound and continuing" global warming changes have had an uneven impact on Arctic wildlife, threatening the icy habitats of polar bears and walrus but giving whales greater access to northern feeding areas, the report said.

Seven of 19 of the world's polar bear sub-populations are declining in number, said the researchers, with trends in two populations linked to reductions in sea ice.

Conversely, the decline in sea ice extends access to waters north of Bering Strait for feeding by seasonally-migrant baleen whales, according to the report. "Sea ice reductions in the Northwest Passage also provided the opportunity for overlap between bowhead whales from the West Greenland and the Alaska populations, suggesting that reduced summer sea ice may facilitate exchange between the two populations."

Arctic region is warming

The warming has also caused new vegetation to sprout in many areas, and has led to a 20% increase in phytoplankton, microscopic organisms that are the basis of the oceanic food chain.

The researchers said that the impacts on the Arctic wildlife of increased biomass production in Arctic tundra ecosystems are unclear. "Despite changes in tundra biomass, migratory barren-ground caribou appear to be within known ranges of natural variation, with many herds that have experienced declines in the past decade beginning to increase or stabilise. Despite this, rapid environmental and social changes in the Arctic are a concern," they said.

The report found that changes in Arctic winter wind patterns first detected in 2010 have continued. "The Arctic region continues to warm, with less sea ice and greater green vegetation," said Monica Medina, of the U.S. National Oceanic and Atmospheric Administration (NOAA). "Reports like this one help us to prepare for increasing demands on Arctic resources so that better decisions can be made about how to manage and protect these more valuable and increasingly available resources."

18. Fukushima Daiichi Nuclear Power Plant Crisis

OVERVIEW

<http://find.galegroup.com/gic/infomark.do?idigest=5240efa7b366f5e884>

[b288775e253a14&searchType=BasicSearchForm&type=portal&prodId=GIC&queryId=Locale\(en,US.\):FOE=\(PL,None,5\)G1551&portalId=G1551&version=1.0&userGroupName=gale&source=gale](http://b288775e253a14&searchType=BasicSearchForm&type=portal&prodId=GIC&queryId=Locale(en,US.):FOE=(PL,None,5)G1551&portalId=G1551&version=1.0&userGroupName=gale&source=gale)

On 11 March 2011, a record undersea earthquake triggered a massive tsunami, quickly producing waves of destruction along a broad region of the northeast Japanese coast. Within minutes, a tsunami estimated at 10 meters (33 feet) swept inland, sweeping away whole coastal villages, killing tens of thousands of people, and creating a swath of damage estimated in the hundreds of billions of dollars. In addition to death and destruction, damage to the Fukushima Daiichi nuclear power plant posed both immediate and long-term dangers to the region. Japanese Prime Minister Naoto Kan characterized the combined disasters as the most serious challenge to Japan since World War II.

The earthquake triggered scrams (emergency shut downs) at multiple nuclear reactors plants across in the northern part of Japan. Fires at three nuclear plants heightened fears of potential radiation leaks. Nuclear officials and monitoring agencies initially reported no measurable radiation leaks, and officials with the Incident and Emergency Centre of the International Atomic Energy Agency (IAEA) subsequently reported the safe shutdown of at least seven nuclear power plants.

Despite the successful reactor shutdowns, evacuations around five nuclear plants took place as a precaution. The most severely damaged nuclear plant was initially identified as Tokyo Electric Power Co's (TEPCO) Fukushima Daiichi facility located 240 km (150 miles) north of Tokyo.

With the cooling pumps disabled, engineers struggled to cool the reactors, ultimately using direct infusions of seawater, laced with boric acid. The use of seawater was a desperate measure and one that normally renders reactors permanently inoperable. It was necessary to use seawater, however, because pure water was unavailable.

In an initial effort to avoid a rupture in the containment housing, engineers released slightly radioactive water vapor. Officials assured the public that no leakage of more radioactive (and much more dangerous) fuel waste would occur during the controlled releases. Nitrogen-16, the radioactive isotope in coolant vapor, has a very short half-life of five to seven seconds and rapidly reacts and decays to non-radioactive oxygen when mixed with water vapor and atmospheric gases. For that reason, the IAEA and Japanese environmental officials initially expressed confidence that any intentional radioactive release of vapor would pose no substantial health risk or cause environmental damage.

Reports of radiation levels conflicted and shifted rapidly. On 16 March, IAEA officials said that there were reports of high levels of radioactivity at a location between reactor No. 3 and reactor No. 4. Japanese engineers measured radiation dose rates equivalent to thousands of typical medical chest X-rays per hour. There were low level atmospheric releases of radiation ultimately detected at extremely low levels around the northern hemisphere.

At the start of the crisis at Fukushima, radiation levels remained consistently near levels typically encountered in a medical X-ray. At other times, the levels shot up to nearly 20 times that level.

The 1979 Three Mile Island accident in Pennsylvania ranks as the most serious in U.S.

history, even though it caused no direct fatalities or injuries. The full extent of long term health impacts, including associated cancers, remains a subject of study and controversy. A loss of coolant to one of the reactor cores at Three Mile Island allowed the core to overheat and partially melt the containment cage. Ultimately, a restoration of coolant brought the situation under control. To avoid damage to the containment housing, authorities deliberately vented slightly radioactive vapor. Experts later calculated the radiation released as within environmentally allowable limits. During the accident there was a voluntary precautionary evacuation of pregnant women and young children who lived within 8 km (5 mi) of the nuclear plant. Fears of a more serious accident, however, caused an estimated 200,000 people to flee the immediate area around the plant. Following the accident, an investigation by the NRC concluded that the accident was a result of a combination of design deficiencies, engineering failures, and human error. Although the damaged reactor was permanently sealed, the other reactor at Three Mile Island continues to operate.

The 1986 Chernobyl accident in Ukraine was far more severe because the explosion took place following an extremely fast and powerful pulse or transient in an operating reactor. Dust and debris from the Chernobyl reactor explosion carried hundreds of thousands of terabecquerels (one terabecquerel equals one trillion becquerels) of radioactive isotopes into the atmosphere. The lack of containment allowed an explosion of debris contaminated with highly radioactive heavier isotopes such as radioactive uranium-235, which has a half-life of more than 700 million years, and cesium-137, which has a half-life of approximately 30 years (instead of the mere seconds of half-life that the isotopes released during the initial controlled ventings or the outer casing explosions in Japan). As a result, the large exclusion zone around the Chernobyl plant will remain uninhabitable for periods ranging from decades to thousands of years. Although early fatalities and severe injuries were limited to Chernobyl plant personnel and emergency response teams, records indicate that at least 600,000 people received elevated doses of radiation. Considerable debate has ensued about the number of people killed from the subsequent effects of the Chernobyl-related radiation exposure; some studies indicated that extra deaths, usually from cancer, numbered in the low hundreds, whereas others estimated the additional deaths to reach into the thousands.

On 12 April, Japan's nuclear safety agency recommended to the IAEA that the designated crisis level characterizing the Fukushima Daiichi power plant accident be increased from a level 5 to a level 7 event on the International Nuclear and Radiological Event Scale (INES). Although nuclear experts pointed to fundamental differences that made the deadly Chernobyl disaster far more severe, placing the Fukushima crisis on the same level (the highest or most severe possible) clearly distinguished the Fukushima crisis as the most severe since Chernobyl.

Although the Chernobyl blast explosively expelled lethal amounts of radiation, some public health experts openly questioned whether the long release of radiation at Fukushima, cumulative in the case of slow-decaying isotopes, might approach or possibly eventually surpass Chernobyl levels. In addition to expressing concern about still rising levels of radiation in seawater surrounding the plant, Japanese officials also retroactively updated reported levels of contamination in air, water, and in the food grown in the region.

Early in the crisis, IAEA experts asserted that the most severe scenario initially facing Japanese engineers with regard to the reactors was a meltdown in the No. 3 reactor, the only unit using fuel rods that contain a small amount of plutonium, a highly toxic

element. Any such plutonium leakage would be extremely hazardous to the environment and human health. A meltdown of any reactor is serious, with the potential for groundwater and atmospheric pollution. The release of plutonium would, however, be extremely dangerous to the environment and human health. A meltdown allows the hot core to burn through the reactor containment vessel. In addition to direct contamination of underlying soil and groundwater, more models project the development of a highly radioactive plume of steam into the atmosphere. Such a meltdown would be considered a major accident but, even so, would produce a radioactive plume much lower in altitude and of much shorter duration and radioactivity than was produced during the Chernobyl disaster.

A week into the crisis, plant engineers, along with military units called in to assist, faced a multifaceted and escalating crisis involving probable breaches in reactor core containment and the overheating of spent fuel rods in three separate cooling ponds. Efforts by helicopter and ground based water cannon crews were hampered by high radiation levels that limited the time that crews could work in certain areas of the facility. Facing multiple threats, the resources deployed focused on cooling and containing the No. 3 reactor, the only reactor with a mixture of uranium and plutonium fuel (mox fuel).

Water draining from the Fukushima facility, which had been sprayed in an attempt to cool reactors and replenish spent rod cooling pools, spilled back into the sea, elevating levels of radioactive iodine-131 off the coast near the facility. As of April 7, 2011, Fukushima workers had pumped over 10,000 tons of radiation-contaminated water into the ocean. In response, Japanese officials imposed an 18-mile (30-km) no-fishing zone and later prohibited ship movement within the exclusion zone. Traces of radioactivity consistent with that expected from the accident—initially at levels too low to be an immediate threat to public health—were discovered in rainwater and atmospheric samples in China, South Korea, Vietnam, and as far away as the eastern coast of the United States.

The United States and other countries established larger evacuation zones for military and diplomatic staff than were initially set by the Japanese.

Japan's Health Ministry expanded the area from which food and milk exports are banned due to higher than normal levels of contamination. In Tokyo, parents were cautioned not to use tap water in the preparation of infant formula because elevated levels of radioactive iodine in tap water exceeded the recommended exposure levels for infants. A number of countries in Asia imposed bans on an array of Japanese agricultural and seafood exports and the U.S. Food and Drug Administration (FDA) banned the importation of milk products, vegetables, and fresh fruits from areas near the Fukushima plant.

Nuclear officials, physicists, and health officials initially stressed that the accident in Japan differed greatly from the Chernobyl disaster and the Three Mile Island accident. The differences ranged from the type of reactors involved to the safety measures provided by differing facility designs. Despite the reassurances, there was broad media skepticism, some justified by commentators as reasonable given a history of incomplete or deceptive disclosures during prior nuclear incidents, and conflicting reports about the potential severity of the rapidly evolving accidents in Japan.

Weeks into the crisis, TEPCO was frequently criticized for a lack of openness. Its ability to manage the crisis was widely questioned after erroneous reports of radiation at 10

million times normal levels was corrected to 100,000 times normal levels. An array of experts also questioned provisions for the safety and care of workers at the Fukushima site. Weeks after the crisis started, Masataka Shimiz, president of TEPCO, offered an official apology to the Japanese people for the release of radiation.

Media reports of the number of people exposed and the levels of exposure varied wildly, but by 24 March, the IAEA received official reports that at least three workers at the Fukushima facility suffered exposure to high levels of radiation. The official reports submitted to IAEA also indicated that at least 17 workers at the Fukushima plant suffered exposures at levels more than three times the normal annual exposure for workers and 30 times the normal exposure for a person living in an industrialized country. In response to the ongoing crisis, Japan's health ministry raised the limits of allowable exposure for emergency response workers.

On 13 April—following a week of strong aftershocks and precautionary tsunami warnings that continued to slow recovery operations and again forced temporary evacuations of emergency workers from the damaged Fukushima Daiichi nuclear plant—Japan's Science Ministry offered complex assessments of radiation leakage. In one statement, officials characterized the radiation levels in ocean waters near the Fukushima plant as "at the highest levels since the accident began." Radiation levels 23 times above legal limits were observed in the waters off Minamisoma, a nearby city. The radiation increases were attributed to dilutions of radioactive runoff from seawater used in an attempt to cool the damaged reactors and spent fuel rod cooling pools at the Fukushima plant.

In mid-April, evacuations from the inner 20 kilometer (12 mile) zone became mandatory. Government organized forays allowed most of the 78,000 people who lived in the zone to briefly return to secure belongings and gather essential items. A heavily contaminated zone within 3.6 kilometers (2 miles) of the plant remained totally off limits. In order to prevent the spread of radioactively contaminated dust, many of the residents dressed in outer clothing that they could subsequently discard. Approximately 60,000 people live in a zone 20 to 30 kilometers (12 to 18 miles) from the plant where evacuation remained voluntary.

In contrast, however, the same official estimates characterized the radiation levels in the land around the plant as "stabilizing," with areas near Tokyo returning to "near normal" levels.

The broader impact of the nuclear accidents remained uncertain. Reactors in Europe were denied automatic extensions of operating licenses pending a safety review. China announced a halt to building nuclear plants, pending additional engineering reviews. The United States and other countries announced plans for additional safety testing along with comprehensive reviews of nuclear energy use and development policies. Prior to the Fukushima nuclear accident, 62 nuclear reactors were under construction around the world, 152 more were in post approval design, and 324 were in some stage of site study prior to formal approval.

China and South Korea increased criticism of Japan's governmental response to the crisis, and protests against nuclear power clouded elections within Japan. An array of international economists argued that the costs of the accident, along with additional losses resulting from power shortages and transportation disruptions hampering automotive and electronics supply chains vital to industry in other countries, could

cripple a tenuous global economic recovery from recession. At a minimum, financial experts said that the scale of the disaster in Japan threatened the country's already slow economic recovery.

On 17 April, TEPCO produced an assessment of the Fukushima crisis, a report attempting to mitigate criticism of their response, provide an assessment of the damage, and provide an outline of anticipated events and responses. TEPCO anticipated that it would take six to nine months of concentrated efforts to repair the damage and bring the radioactive leaks to a halt. The company anticipated being able to reduce radiation leaks within three months and bring the reactor temperatures under control (a "cold" shutdown state producing only heat from normal decay) within nine months. The plant will be thereafter closed and entombed.

On 12 May 2011, TEPCO officials released results of the first direct examination of the No. 1 reactor by heavily protected engineers. TEPCO officials said that the damage was more extensive than anticipated; with more than a third of the length of the nuclear fuel rods exposed to air, engineers feared that a full meltdown of the nuclear fuel in any of the damaged reactors could rupture the respective containment vessel. Plant officials and engineers also expressed fears that continued leakage of highly radioactive water into areas around the pressure vessels may be evidence that the vessels have already suffered cracks or a partial rupture. Any vessel rupture increases the risks of broader environmental contamination and dramatically alter current recovery procedures and timelines.

In June 2011, engineers with Japan's Nuclear Emergency Response Headquarters and IAEA officials concluded that three of the reactors at the Fukushima Daiichi nuclear power plant suffered full meltdowns following damage to cooling systems caused by the massive March 2011 earthquake and tsunami. Nuclear rods in Fukushima Daiichi reactors 1, 2, and 3 reached temperatures sufficient to melt the casings. The molten remains of the rods pooled at the bottom of the respective reactor pressure vessels.

Reactor No. 1 suffered a meltdown within 24 hours of the tsunami's damage to the cooling system power supply and backup generators. Robotic inspections of reactor No. 1 indicated that radioactive material was leaking from the pressure vessel. The meltdowns in reactor Nos. 2 and 3 took longer and occurred in stages, with parts of the broken rods melting at different times. Some experts remained skeptical that reactors 2 and 3 suffered complete meltdowns, but at a minimum there was evidence of molten radioactive fuel rod remnants pooled at the bottom of those reactor vessels.

On 18 June 2011, Fukushima engineers halted the removal of radioactive water surrounding the damaged core housings. Within hours of starting the water removal process, radiation spikes had overwhelmed radiation buffers designed to last for months. Because external water is still being used to cool the reactors, experts feared that unless the removal process problems are quickly resolved, the highly radioactive water now pooling in the reactor housings could begin to overflow containment walls with a matter of weeks. On 21 June, engineers restarted the water decontamination process with plans to replace the filters more frequently. Engineers again had to suspend the process, however, after a pump failed.

In July 2011, Japanese agricultural officials halted exports and expanded an export ban zone surrounding the crippled Fukushima Daiichi nuclear plant. The move came after radioactively contaminated meat was found in food markets scattered around Japan. The

discovery of radioactively contaminated meat extends a list of products including seafood, milk, vegetables, and tea with elevated levels of radioactive cesium.

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19. Replacing fossil fuels with solar would add to strain, report warns

BY:
BRENDAN NICHOLSON
From:

The Australian December 01, 2011 12:00AM

<http://www.theaustralian.com.au/business/mining-energy/replacing-fossil-fuels-with-solar-would-add-to-strain-report-warns/story-e6frg9df-1226210652728>

TO replace fossil fuels with solar power, Australia would have to build solar panels covering more than 4000sq km, a key think tank has warned.

In a report to be released today, the Australian Strategic Policy Institute says that could also be expressed as 200sq m of panel a person, or about four times the average amount of roof area per person in Australia today.

Author Andrew Davies said it was likely that liquid fuels would still be needed for heavy land transport and aviation.

Because of their low overall efficiency, adding biofuels would make matters significantly worse, Dr Davies said.

"About 25 per cent of Australian energy consumption goes towards transport," he said.

"If that energy were to be produced by biofuels it would require an additional 97,700sq km of crop production, about the area currently devoted to the growing of wheat in Australia."

Dr Davies also suggested that while there was no need in the short to medium term for Australia to establish a national oil reserve to ensure supply security, other countries in the region were in a less secure position.

"Helping regional states via a shared reserve program could form part of Australia's regional stability-building strategy, foreign aid program or both," Dr Davies said.

That would not be based on cost-effectiveness.

"It would have to be part of a strategy to enhance Australia's broader security by reducing

the exposure of already fragile states to external forces well beyond their ability to control," Dr Davies said.

"Australia is geographically and politically suited to managing regional energy contingency stocks.

"For reasons of efficiency and security self-interest, it would be most sensible for Australia to develop such relationships with nearby states Indonesia, Papua New Guinea, East Timor, New Zealand and the South Pacific island states.

"One option is to work towards one or more.

"Given the modest oil requirements of Australia's immediate neighbours, an initial common reserve that includes Australia, New Zealand, Papua New Guinea and the Pacific island countries should be feasible," he said.

Used this way, a strategic reserve would spread the costs of extending Australia's own emergency stockpile and usefully complement other relationship-building measures in the southwestern Pacific.

20. China talks the talk but climate deal hopes fade

BY:
GRAHAM LLOYD

From:

[The Australian](#) December 05, 2011 12:00AM

<http://www.theaustralian.com.au/national-affairs/china-talks-the-talk-but-climate-deal-hopes-fade/story-fn59niix-1226213585311>

CHINA has stepped up its carbon-cuts diplomacy in Durban but as government leaders arrive for the final week of negotiations the prospects of a global deal to combat climate change appear to be as far away as ever.

Draft texts wrapping up the first week of talks at the UN conference show little progress was made on the key issues -- including the future of the Kyoto Protocol and a binding carbon treaty.

The world's three big emitters, China, the US and India, have all dashed hopes of speedy progress on an international agreement with binding targets.

Without some progress, it is likely the Kyoto agreement will crash and developing nations may even walk away from gains that have been made in other areas, including new funding for projects in the developing world.

China, the world's biggest carbon emitter, appeared to hold out the prospect that it would accept binding emissions targets. Lead negotiator Su Wei told Reuters: "We do not rule out the possibility of legally binding. It is possible for us, but it depends on the negotiations."

But other countries and leading non-government groups said China's offer was highly conditional. It would not take effect until after 2020 and was linked to the state of its economy at the time and actions taken by other countries. The US says it will not consider any deal that excludes binding targets for China and India. And India says it will not accept legally binding targets, full stop.

Alden Meyer, director of strategy and policy with Union of Concerned Scientists, said India was "a lot more hardcore".

"They are saying they are not even willing to start a process here that would lead to a legally binding negotiation," he said.

"India and the US have concerns about legally binding targets for precisely opposite reasons. The US wants India and China bound (by targets) and India does not want to be bound. It is almost a marriage of convenience.

They can both exert pressure from different ends."

A draft statement on negotiations for the future of Kyoto, issued on Saturday, said amendment and ratification of a second commitment period before 2013 were impossible at this point.

Several options were still on the table. There could be a two-stage process involving a decision and a package of amendments agreed at Durban with ratification coming later and linked to progress on a broader international agreement.

There could be a decision on Kyoto without any amendments. Or a declaration to keep talking, the weakest option considered unacceptable to many countries.

"We really are at a fork in the road and countries have to decide: do we go the voluntary route or do we stay in a legally binding rules-based system?" Mr Meyer said.

"Even the EU is only going to stay in Kyoto if it is part of an agreement that this is a transition to something broader that includes US, China and other countries."

21. Blocked sea-level research probed

BY:

IMRE SALUSINSZKY

From:

The Australian December 05, 2011 12:00AM

<http://www.theaustralian.com.au/national-affairs/blocked-sea-level-research-probed/story-fn59niix-1226213593352>

NSW Environment Minister Robyn Parker has asked department officials to explain why they put the lid on internal research that questioned catastrophic predictions of sea-level rises as a result of climate change.

A former senior researcher in the department, Doug Lord, said yesterday two papers he co-authored with colleagues and was due to present at conferences

were suppressed because they suggested sea-levels on the east coast are rising at only one 10th of the rate estimated by the federal government, based on data from the Intergovernmental Panel on Climate Change.

Mr Lord said long-term data gleaned from gauges in Sydney Harbour suggested sea levels were rising at the rate of about 1mm per year. This would lead to a rise of about 90mm by 2100, not the 900mm rise predicted by the IPCC.

"We can't identify an acceleration of the rate, which doesn't mean that it's not there," Mr Lord told The Australian. "But if it's going to reach those levels, it's got to accelerate at some time in the future."

Mr Lord, who does not question the science of climate change, said the papers were pulled by the department at the last minute, after they had been accepted and peer-reviewed.

"It's very odd that they left that until the last minute and withdrew both papers at the latest possible opportunity," he said.

A spokeswoman for Ms Parker said the minister had "asked for a thorough explanation" and wanted more information.

In a statement, the Office of Environment and Heritage said it "fully supports the analysis of tide gauge records to estimate historical sea-level rise trends and the publication of these analyses for discussion and debate".

But the agency insisted "historical trends of sea-level rise recorded by tide gauges do not necessarily provide a good indication of future sea levels because trends are expected to change with continued global warming".

The agency said the papers were withdrawn over "concerns raised by an independent statistician about the statistical analysis of tide gauge records".

22. GFC's emissions effect at an end

BY:
GRAHAM LLOYD

From:

The Australian December 05, 2011 12:00AM

<http://www.theaustralian.com.au/national-affairs/gfcs-emissions-effect-at-an-end/story-fn59niix-1226213587097>

THE dampening impact of the global financial crisis on world carbon dioxide emissions has been short-lived, according to an annual survey published today by the scientific journal Nature.

The report estimated global carbon dioxide emissions increased by a record 5.9 per cent last year because of strong emissions growth in emerging economies and a return to emissions growth in the developed world.

A second paper in Nature, also published today, gives new evidence of a link between human CO₂ emissions and global warming. The paper says at least 74 per cent of the climate warming observed since the mid-20th century was extremely likely to be caused by human activities.

The first study found contributions to global emissions growth last year were largest from China, the US, India, the Russian Federation and the EU, with a continuously growing global share from emerging economies, a statement issued by report author, the Global Carbon Project, said.

Coal burning was at the heart of the growth in fossil fuel and cement emissions accounting for 52 per cent of the total growth.

CSIRO researcher and Global Carbon Project executive director Pep Canadell said the atmospheric concentration of CO₂ last year rose to 389.6 parts per million, the highest recorded in at least the last 800,000 years.

The report co-author, CSIRO's Mike Raupach, said last year's figures were the highest annual growth recorded, and the highest annual growth rate since 2003.

The international science team preparing the analysis tracked emissions growth in tandem with significant economic events since 1960. "The analysis suggests in times of crisis, countries maintain economic output by supporting less-energy intensive activities," Dr Raupach said. "These burst-like dynamics are related to easing of energy prices, government investment

to stimulate economic recovery, and the effect of a decade of high economic growth in the developing world which propagated into a rapid global, post-GFC return to high emissions."

Estimates of carbon emissions in 2009 and last year in the Carbon Project report are based on data from the energy company BP.

The findings on global warming being caused by human activities are based on an assessment of the Earth's energy balance rather than computer climate models as have been used in the past, lifting confidence in the result.

23. UN chief doubts comprehensive climate deal likely

AP foreign, Wednesday December 7 2011

<http://www.guardian.co.uk/world/feedarticle/9982906>

ARTHUR MAX

Associated Press= DURBAN, South Africa (AP) — An all-encompassing climate deal "may be beyond our reach for now," the U.N. chief said Tuesday as China and India delivered a setback to European plans to negotiate a new treaty that would bind all parties to their pledges on greenhouse gas emissions.

The European "road map" toward a new accord that would take effect after 2020 is a centerpiece of negotiations among 194 countries at a U.N. climate conference in the South African coastal city of Durban. It has been presented as a condition for Europe to renew and expand its emissions reduction targets under the 1997 Kyoto Protocol, which expires next year.

"We must be realistic about expectations for a breakthrough in Durban," said U.N. Secretary-General Ban Ki-moon as he opened the final ministerial stage of the two-week conference. "The ultimate goal for a comprehensive and binding climate change agreement may be beyond our reach for now."

Political differences, the worldwide financial crisis and a divergence of

priorities among rich and poor countries are barriers to an agreement on a future negotiating path, Ban said. But he urged nations to resolve lesser issues.

"We must keep up the momentum," he said. "It would be difficult to overstate the gravity of this moment. Without exaggeration, we can say the future of our planet is at stake."

As the conference moved into high gear, EU and U.S. officials said that China made it clear in private meetings that it will not accept international limits on its carbon emissions in the future.

China has publicly stated it is willing to embark on negotiations on a legally binding post-2020 deal, but it has never explicitly stated that it would accept binding restrictions for itself.

"It is not my impression that there has been any change at all in the Chinese position in regard to a legally binding agreement," U.S. envoy Todd Stern told reporters after meeting with the Chinese delegation.

An EU delegate said that China unequivocally rejected the idea of assuming internationally binding limits on its emissions during a closed meeting on Monday with EU climate commissioner Connie Hedegaard. The delegate spoke on condition of anonymity because the negotiations were still in an early stage.

China maintains that it is still a developing country with millions of impoverished people, despite its huge cash reserves. Most research also agrees with Beijing's contention that it is moving faster than most countries in closing dirty industries and developing clean energy.

As for the U.S., Stern said it was prepared to talk about the next phase of fighting climate change, but not to declare in advance that the objective is a legally binding treaty. Such a goal would be difficult with Washington insisting any future agreement relate to all countries with equal legal force. Currently, industrial countries have legally binding emissions obligations, but any action by developing countries is voluntary.

"Some countries have projected the question of a legally binding agreement in the future as a panacea for climate change. This is completely off the mark," said Indian Environment Minister Jayanthi Natarajan, speaking also

for China, Brazil and South Africa, the world's four fastest developing economies, known as BASIC.

"Developing countries should not be asked to make a payment every time an existing obligation becomes due on the part of developed countries," she said.

BASIC said it was essential that the industrial countries renew commitments to cut carbon emissions as laid out in the Kyoto Protocol, moving into what is described as a second commitment period beginning in 2013.

The U.N. chief urged the industrial countries to keep Kyoto alive, calling it the closest thing to a climate treaty.

"I urge you to carefully consider a second commitment period," Ban said, drawing applause for the only time in his 15-minute address to the 15,000 participants.

South African President Jacob Zuma said the dispute over continuing Kyoto was threatening other issues. If it is not resolved, he told the conference, "the outcome on other matters will become extremely difficult."

Also Tuesday, scientists and U.N. agencies reminded the delegates that carbon emissions were still climbing and the Earth still warming while they were seeking political solutions.

An international treaty on climate change wouldn't be enough to avert a dangerous rise in global temperatures, and countries need to voluntarily make deeper cuts in carbon emissions, said Achim Steiner, the head of the U.N. Environment Program.

A UNEP report, released last month and formally presented to the host government South Africa, said the world is losing ground in controlling heat-trapping greenhouse gases.

"We are not moving fast enough," Steiner said. "We are losing time."

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Big Oil Heads Back Home

<http://online.wsj.com/article/SB10001424052970204479504576638731600191>

Energy companies are shifting their focus away from the Middle East and toward the West—with profound implications for the companies, global politics and consumers

Big Oil is redrawing the energy map.

For decades, its main stomping grounds were in the developing world—exotic locales like the Persian Gulf and the desert sands of North Africa, the Niger Delta and the Caspian Sea. But in recent years, that geographical focus has undergone a radical change. Western energy giants are increasingly hunting for supplies in rich, developed countries—a shift that could have profound implications for the industry, global politics and consumers.

Driving the change is the boom in un conventionals—the tough kinds of hydrocarbons like shale gas and oil sands that were once considered too difficult and expensive to extract and are now being exploited on an unprecedented scale from Australia to Canada.

The U.S. is at the forefront of the un conventionals revolution. By 2020, shale sources will make up about a third of total U.S. oil and gas production, according to PFC Energy, a Washington-based consultancy. By that time, the U.S. will be the top global oil and gas producer, surpassing Russia and Saudi Arabia, PFC predicts.

That could have far-reaching ramifications for the politics of oil, potentially shifting power away from the Organization of Petroleum Exporting Countries toward the Western hemisphere. With more crude being produced in North America, there's less likelihood of Middle Eastern politics causing supply shocks that drive up gasoline prices. Consumers could also benefit from lower electricity prices, as power plants switch from coal to cheap and plentiful natural gas.

And the change is reshaping the oil companies themselves, as they reallocate their vast resources to new areas and new kinds of fuel. Working in the rich world—with its more predictable taxes and investor-friendly policies—removes some of the risks about the big oil companies that worry investors, making them less vulnerable to the resource nationalism of petrostates like Russia and Venezuela.

"A company like Exxon Mobil can eliminate the technological risk" of developing unconventional, says Amy Myers Jaffe, senior energy adviser at Rice University's Baker Institute. "But it can't eliminate the risk of a Vladimir Putin or a Hugo Chavez."

This new way of looking at risk is at the heart of the transformation. International oil companies traditionally face a choice: They can either invest in oil that is easy to produce but located in politically volatile countries. Or they can seek opportunities in stable countries where the oil is hard to extract, requiring complex and expensive production techniques.

Now, in a sense, the choice has been made for them. Big onshore fields in the world's most prolific hydrocarbon provinces are increasingly the preserve of national oil companies, state-owned behemoths like Saudi Aramco and Russia's OAO Rosneft and OAO Gazprom. For foreign majors like Royal Dutch Shell PLC and BP PLC, their former heartlands in the Gulf sands are now largely off-limits.

Shut out of the Middle East, they have responded with a huge push into new areas, both geographic and technological. Over the past few decades, they have built vast plants to produce liquefied natural gas, or LNG. They have drilled for oil in ever-deeper waters, ever farther offshore. They have worked out how to squeeze oil from the tar sands of Alberta. And they have deployed technologies like hydraulic fracturing, or fracking, and horizontal drilling to produce gas from shale rock.

Wood Mackenzie, an oil consultancy in Edinburgh, says that more than

half of the international oil companies' long-term capital investments are now going into these four "resource themes"—a huge shift, considering how marginal the companies once considered them.

There are also drawbacks to the new focus on nontraditional kinds of hydrocarbons. Environmentalists strongly oppose shale-gas extraction due to fears that fracking may contaminate water supplies, the oil-sands industry because it is energy-intensive and dirty, and deep-water drilling because of the risk of oil spills like last year's Gulf of Mexico disaster.

There are financial considerations, too. While conventional assets are relatively easy to develop and historically have offered good returns, projects in some more technically difficult sectors—like deep-water and LNG—typically take longer to bring on-stream, and are higher cost, meaning returns are lower.

But there is an upside for the majors. "The silver lining is the shape of the profile of these projects, which is different than conventional ones," says Simon Flowers, head of corporate analysis at Wood Mackenzie. LNG ventures, for example, can deliver contract levels of gas at a steady rate over 20 years. "So the returns may be lower, but overall you have a more dependable cash-flow stream," he says.

By pursuing these nontraditional fuels, the oil companies are committing themselves ever more deeply to the wealthy nations of the Organization for Economic Cooperation and Development. Wood Mackenzie says \$1.7 trillion of future value for all the world's oil companies—52% of the total—is in North America, Europe and Australia. The consultancy has identified a "significant westward shift" in oil-industry investment, away from traditional areas like North Africa and the Middle East "towards the Brazilian offshore, deepwater oil in the Gulf of Mexico and West Africa and unconventional oil and gas in North America." And then there's Australia, far out east, "which is in the early stages of a spectacular growth phase."

[Enlarge Image](#)

Close

Consider Shell. Seven years ago, the oil giant, synonymous with turbulent hot spots like Nigeria, decided to shift resources to more-developed nations that offered a friendly environment for investors and predictable tax regimes. Shell used to split spending on the upstream—the basic business of exploring for and producing oil and gas—roughly 50/50 between nations in the OECD and those outside of it. It's now 70/30 in favor of the OECD, with the bulk going to Canada, Australia and the U.S.

"The risks in OECD are technical, but they're easier to manage than political risk," says Simon Henry, Shell's chief financial officer. "In the OECD, you have more control of your operations."

With the new turf comes a new focus: Shell will soon be producing more natural gas than oil. That might have scared investors a decade or two ago. But with gas demand set to grow strongly, especially in Asia, the future for gas-focused companies is looking increasingly rosy—especially after the Fukushima disaster, which prompted a rethinking of nuclear power in Japan and elsewhere.

Entrenching Its Position

Like Shell, Exxon Mobil Corp. is entrenching its position in the Americas, home to just over half its resource base. Its unconventional resources have grown by almost 90% over the past five years to 35 billion oil-equivalent barrels—partly thanks to its 2010 acquisition of XTO Energy, a big shale-gas player. Exxon's U.S. unconventional production alone is expected to double over the next decade.

Some giants are looking further afield. Chevron Corp.'s three focus areas—the parts of the world that account for the bulk of its exploration budget—are the U.S. Gulf of Mexico, offshore West Africa and the waters off western Australia.

In particular, the company has staked out a huge position in Australian natural gas; its Gorgon LNG project in Australia is one of the world's largest. The push is based on expectations of surging demand for the fuel in Asia, largely in China, which wants to improve air quality in its heavily polluted cities by switching from coal to gas in power generation and running more commercial vehicles and buses on natural gas.

It "wasn't a conscious decision" to move into the OECD, says Jay Pryor, head of business development at Chevron. The company doesn't decide what projects to pursue based on where they are in the world, but on the quality of the resource, the commercial terms and the geopolitical risk. "The best rocks with the best terms are going to get the quickest investment," he says. Money has flowed into the U.S. and Australia because they offer the best incentives to oil companies, he says.

In recent years, Chevron has also expanded into another promising part of the OECD—Europe, which some estimates suggest has shale-gas reserves comparable to those in the U.S. Chevron has picked up millions of acres of land in Poland and Romania, where it will soon be drilling for shale gas. That's part of a wider trend: Dozens of companies are now exporting to Europe technologies used to open up shale deposits in the U.S.

Holding Back

Not all oil companies have piled into unconvensionals the way Shell and Chevron have. BP, for one, has far fewer investments in tar sands and shale gas than its peers, though it has an unrivaled position in deep-water oil. That means it has less of a presence in the OECD than Shell: Its biggest projects are in poorer countries like Angola, Azerbaijan and Russia, and in recent years it has won a string of licenses and contracts in India, Iraq, Egypt and Jordan.

Yet even BP has been bolstering its position in the OECD. It said recently it was pressing ahead with a £4.5 billion (\$7 billion) investment in the North Sea's Clair oil field, part of a five-year, £10 billion program.

Still, being in the OECD doesn't guarantee oil companies an easy ride. Operators in the North Sea were shocked earlier this year when the U.K. government suddenly increased taxes on oil producers. In France, authorities recently banned hydraulic fracturing. And in the U.S., the drilling moratorium in the Gulf of Mexico, imposed after the Deepwater Horizon blowout, threw many of the majors' plans into disarray.

But still, for the most part, the risks are much greater in the non-OECD. "The majors went to Venezuela and lost their property," says Ms. Myers Jaffe of the Baker Institute. "They went to Russia and had to whisk their CEO off to a safe house. They went to the Caspian and realized they couldn't get the oil out. I for one would much rather invest in a company that had 70% of its spending in the OECD."

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