



## Drumbeat: December 3, 2010

Posted by [Leanan](#) on December 3, 2010 - 10:30am

### [Iraq Needs Robust Oil Exploration, Gas Development-PM's Adviser](#)

LONDON -(Dow Jones)- Iraq needs to plan now for its future by robustly exploring for more oil in its vast fields and capturing more of its natural gas for electricity generation, the country's top energy adviser said.

As the world's largest oil companies begin tapping the potential of Iraq's massive oil and gas fields following recent contract awards, the war-ravaged nation could halve its proven oil reserves within just 20 years if the country doesn't get serious now about exploring for more oil, Thamer Al-Ghadhban, chairman of the advisory committee to Iraqi Prime Minister Nouri Al-Maliki, told Dow Jones Newswires late Thursday in an exclusive interview. Likewise, he said, Iraq must boost its gas production and build more gas-fired power plants rather than burning off most of the gas associated with oil output, as it does today.

### [U.S. Oil, Natural Gas Rig Count Climbs by 26 to 1,713, Baker Hughes Says](#)

Oil and natural-gas rigs operating in the U.S. jumped to a 23-month high, gaining 26 to 1,713, according to data published by Baker Hughes Inc. Oil rigs gained 18 to 742, and natural-gas rigs added eight to 961.

### [Eastern Siberia: A new frontier](#)

Part of the rationale behind the increased pace of E&P activity in Eastern Siberia is the introduction of a more favourable tax regime for operators in the region. However, this is partially counteracted by high development costs, due to the region's remote nature. These should start to come down, as supporting infrastructure matures and the labour market shifts in favour of the professionals required by the industry. The International Energy Agency is expecting Russian oil production to remain relatively flat between now and 2015, as the new capacity in eastern Siberia will mainly serve to offset declines in the West. In the longer term, it expects output to fall to slightly over 9mbpd by 2035, despite a rise in NGL production. In contrast, natural gas output is expected to accelerate from the 480bnm3 seen in 2009 to over 800bnm3 by 2035.

### [California Consumes More Oil Than China: Fact or Market Manipulation?](#)

In this clip dated Nov. 17, CNBC's Sharon Epperson quoted an analyst's note from HSBC (HBC) pointing out that California currently consumes more crude oil than China.

I do not have a copy of the HSBC report, and therefore cannot verify how the conclusion was reached; however, it is hard for me to fathom California even belongs in the same sentence with China on any economic measures.

### ['Guerrilla warfare' pricing hikes gas costs](#)

Gas prices in Eastern Canada have been heading higher on account of the "guerrilla warfare" pricing tactics employed by gasoline retailers, says an industry consultant.

### [Venezuela, Bolivia Say Climate Talks At Risk as Japan Refuses New Cuts](#)

Venezuela and Bolivia said the United Nations climate talks may fall apart because industrial nations including Japan are refusing to promise further cuts to greenhouse gas emissions.

"What we have here after five days is a total uncertainty about the continuity about the second period of commitment," said Pablo Solon, the Bolivian climate negotiator, at a briefing today in Cancun, Mexico. "This is totally unacceptable."

### [No new areas to fish, study finds](#)

The frontier is gone when it comes to fisheries, a new study finds. Every area of the Earth's oceans except around the polar regions is being exploited, leaving no new areas for the expanding human population to open up.

### [The amoeba of cultural change](#)

In the Q&A section of public presentations we often get asked "How do you tell people about Transition ..." Then the questioner launches into a vivid description of how his attempts have failed to get through to his Hummer-driving brother-in-law, or his boss who vacations in the Bahamas, or his fellow churchgoers who rhapsodize over malls and "bargains" at big box stores, or his neighbor with the pristine, overwatered chem-lawn.

You can plug in a multitude of variables to describe the opulent consumption but in each of these instances the approach has failed for the identical reason: Our questioner doesn't understand how to use and work with the dynamics of cultural change.

### [China promises new support to solar development](#)

BEIJING—Beijing is promising new subsidies to develop China's solar power industry -- policies already under fire from the United States as a possible trade violation.

### [BP says gov't estimate of oil flow too large](#)

WASHINGTON (AP) -- BP is mounting a new challenge to U.S. government estimates of how much oil flowed from the runaway well deep below the Gulf of Mexico. The issue will be critical in determining the size of federal pollution fines the company will pay.

### [Don't panic! 'There is no food shortage'](#)

"Stories about some shops having empty shelves are caused by a slight disruption to the timing of supermarket deliveries, which is only to be expected in this kind of weather, but the fact remains that deliveries are happening regularly.

"Buying extra supplies of food won't help the situation and will only end up with people wasting money and wasting food, and I don't think anyone wants to see that."

### [Pemex Sees Supreme Court Support for Oil Contracts](#)

Petroleos Mexicanos, the state-owned oil company, said that the preliminary votes from Mexico's Supreme Court mean that the new performance-based contracts are legitimate.

In a preliminary vote, nine Supreme Court justices upheld a regulation allowing Pemex to pay bonuses to contractors after they meet exploration and production goals, according to an e- mailed court transcript of today's session.

### [Mexico court rejects part of Pemex law challenge](#)

MEXICO CITY (Reuters) - Mexico's Supreme Court voted on Thursday to uphold some rules permitting state oil monopoly Pemex to contract with private companies but said deliberations will continue next week.

"We will resume discussion of this issue next Monday," Chief Justice Guillermo Ortiz said at the end of the court session.

### [Pemex Gets \\$3.25 Billion of Credit From 25 Banks, Reuters Says](#)

Petroleos Mexicanos secured \$3.25 billion in credit from 25 banks, Reuters reported, without saying where it got the information.

The amount includes a \$1.25 billion line of credit for three years with banks including Bank of America Corp., Barclays Plc and JPMorgan Chase & Co., plus a \$2 billion, five-year loan from Citigroup Inc. and HSBC Holdings Plc and other banks, Reuters said.

### [FACTBOX-Key political risks to watch in Venezuela](#)

(Reuters) - President Hugo Chavez's latest nationalization drive, political tensions in parliament, moves against the oil industry and the long tail-end of a recession are all risks to watch in Venezuela in the coming months.

### [Report calls for radical redesign of cities to cope with population growth](#)

By 2040, the world's urban population is expected to have grown from 3.5bn to 5.6bn. The new report calls for a radical re-engineering of cities' infrastructure to cope. "The future is going to look pretty urban ... with more and more people shifting to cities to the point that, by 2040, we're going to have two thirds of all the people in the world living in cities," said Ivana Gazibara, senior strategic adviser at Forum for the Future and an author of the report, Megacities on the Move.

"If we go on with business as usual, what happens is unmanageable levels of congestion because personal car ownership has proliferated," she said. "Cities could be a pretty nasty place to live for the two-thirds of the global population in the next 30 years if we don't act on things like climate change mitigation and adaptation, smarter use of resources and sorting out big systemic things like urban mobility."

### [Texas Proposal Spurs Race to Dispose of Nuclear Waste](#)

WASHINGTON — Aged nuclear plants in Vermont and Illinois may be playing the equivalent of musical chairs in a graveyard, vying for space at a dump in Texas whose owner hopes to accept radioactive waste from many other states.

Under an alliance struck 16 years ago between Vermont and Texas, tiny Vermont can fill up to 20 percent of the space at any low-level nuclear waste dump built in Texas' wide-open spaces. Texas got the right to exclude other states' waste. But as a company prepares to begin construction this month on the state's first one, the arrangement may be jeopardized by swiftly changing circumstances.

A private company that won a contract to operate the plant, at a site in Andrews on the New Mexico border, wants to accept waste from the 36 states that do not have access to a dump for some of their waste now. And a commission made up of representatives from the two states that controls the planned dump has proposed a rule for accomplishing that.

Waste disposal is so difficult, says the company, Waste Control Services, that power plants and other generating sources have reduced their volumes sharply. And Vermont and Texas together produce so little that, the company adds, it would have to charge huge amounts per cubic foot and per unit of radioactivity to get its investment back.

### [Crude Oil Heads for Biggest Weekly Gain in a Month on U.S. Economy Outlook](#)

Oil headed for its biggest weekly gain in a month on speculation that U.S. fuel demand will increase as the economic recovery gathers pace in the world's biggest oil consumer.

Futures have climbed 5.3 percent this week, the most since the period ending Nov. 5, as data showed U.S. home sales rose and manufacturing expanded. A Labor Department report today may indicate that hiring in the U.S. increased for a second month. Oil reached a three-week high after the Bundesbank raised its forecast for German economic growth next year.

"Macroeconomic sentiment has improved with stronger data from the U.S. and China," said Andrey Kryuchenkov, an analyst with VTB Capital in London. "However, this optimism has little to do with fundamentals. A sustained rally is unlikely here."

### [Pump prices headed higher in time for holiday rush](#)

Retail gasoline prices are poised to test highs for the year just as the holiday season pushes into high gear.

Gasoline production has been affected by a series of issues at refineries that serve different parts of the country, which is sending prices higher on futures contracts. That comes as oil prices are climbing on upbeat news about the global economy.

### [JPMorgan Says Crude Oil Price Will Reach \\$120 a Barrel Before End of 2012](#)

Oil will advance to \$120 a barrel before the end of 2012 as consumption grows in emerging economies, according to JPMorgan Chase & Co.

The Organization of Petroleum Exporting Countries, which is responsible for about 40 percent of global supplies, is unlikely to increase production in the first half of next year unless prices surge through \$100 a barrel, the bank said in a report today. Futures traded around \$87 a barrel in New York today, near their highest price in two years.

### [Economic recovery is too fragile for \\$120 oil](#)

Prices will surely rise in the long term but a herd mentality has taken hold of the crude oil market.

### [Oil Analysts Split on Direction of Crude Price Next Week, Survey Shows](#)

Analysts surveyed by Bloomberg News were split over the direction of crude oil prices next week amid signals the U.S. economic recovery is accelerating while stockpiles climb.

Ten of 28 analysts, or 36 percent, forecast crude will advance through Dec. 10. Ten more respondents predicted that futures will be steady. Eight said there will be a decline. Last week, 42 percent of analysts expected the market to be little changed.

### [Saudi Arabia May Boost Arab Light Oil to Highest Price Since August 2009](#)

Saudi Arabian Oil Co., the world's biggest crude exporter, may raise the official selling prices of all of its January-loading supplies to Asia as a surge in processing profits boosts demand for crude.

### [Europe Gasoline at Two-Year High; Gasoil Rises for Third Day: Oil Products](#)

European gasoline barge prices rose to the highest level in more than two years as Koch Industries Inc. bought lots and crude climbed.

### [Coal's Two-Year High Prompts U.K. Utilities to Burn Wood](#)

The highest-priced coal in two years is making wood pellets a viable fuel alternative for U.K. power producers, heralding a doubling of electricity generation from biomass in the next three years.

### [Qatar in talks over \\$6bn plant](#)

European petroleum groups such as Total and Royal Dutch Shell may be seeking entry to Qatar's emerging petrochemicals sector just as the US company ExxonMobil prepares to leave.

The two European petroleum groups are among several companies reportedly in talks with the Gulf state's energy ministry over a US\$6 billion (Dh22.03bn) petrochemicals project that ExxonMobil has probably decided to abandon.

### [Historic rig enjoys a total rejig](#)

It will now be deployed by the Abu Dhabi Marine Operation Company (ADMA-OPCO) and the Zakum Development Company (ZADCO), the two ADNOC operating units that pump oil from offshore fields. Both are joint ventures between ADNOC and international oil companies.

Large-capacity expansion projects at offshore fields - including Umm Shaif and the



Lower and Upper Zakum reservoirs, which are among the biggest in the Gulf - are part of the Abu Dhabi Government's plan to raise the emirate's oil output capacity by a quarter to 3.5 million barrels per day by 2018.

### [Russia's Transneft asks govt to raise tariffs by 2-3% from 2011](#)

Russia's oil pipeline monopoly Transneft has requested Federal Tariff Service's permission to raise prices 2-3% from January 1, a service spokesman told RIA Novosti on Friday.

Transneft head Nikolai Tokarev has said the company had enough funds to service its debt and it did not plan any tariff increases next year.

### [Civilians displaced as Nigeria raids oil delta camps](#)

(Reuters) - Several civilians have been killed and scores displaced during raids by the Nigerian military against armed gangs in the creeks of the oil-producing Niger Delta, local residents said on Friday.

A military taskforce (JTF) comprising the army, navy and air force began raiding three camps which are believed to belong to a notorious gang leader in Delta state on Thursday, close to the Ayakoroma and Okrika communities.

### [Activist claims military 'killing spree' in Nigeria leaves 150 civilians dead](#)

LAGOS, Nigeria — A military raid involving heavily armed soldiers and aerial bombing runs has killed as many as 150 people in Nigeria's oil-rich southern delta, according to a human rights activist.

Oghebejabor Ikim, national coordinator for the Forum of Justice and Human Rights Defense, told The Associated Press Friday that houses have been destroyed, civilians killed and women raped in the operation that began Wednesday.

### [Saudi King Abdullah to Undergo More Surgery on Vertebrae Today in New York](#)

Saudi Arabia's King Abdullah will undergo more surgery today in New York to repair several vertebrae, the official Saudi Press Agency reported, citing a statement from the Royal Court.

### [Sarkozy Seeking to Sell Military Aircraft, Nuclear Reactors on India Visit](#)

French President Nicolas Sarkozy arrives in India tomorrow seeking a slice of its multi-billion dollar military spending and pushing Areva SA's bid to sell at least two nuclear reactors.

### [Falklands oil not enough for profit-leaked cable](#)

LONDON (Reuters) - Oil resources in the Falkland Islands, a British territory claimed by Argentina, are insufficient to be profitable, an ExxonMobil Corp executive said, leaked U.S. documents show.

The cable from the U.S. Embassy in London was dated February 2010 and was about a new oil drilling effort then starting in the Falklands and a resulting rise in tension between Britain and Argentina.

"ExxonMobil International Chairman Brad Corson told us he does not believe there is enough oil on the Falkland Islands Continental Shelf to be profitable, citing Shell's earlier oil exploration attempts which they abandoned," the cable read.

### [Norway sees smaller 2010 non-oil budget deficit](#)

(Reuters) - Norway's Finance Ministry said the 2010 structural non-oil budget deficit will be 5.2 billion crown (\$849.2 million) lower than it forecast in October at 119.6 billion crowns.

The underlying deficit was still some 14 billion Norwegian crowns more than guidelines meant to limit the spending of oil revenues allow during "normal years".

### [EU energy ministers call for better safety for oil drilling](#)

Brussels - European Union energy ministers called Friday for a tightening of the bloc's safety rules on offshore oil drilling as early as possible next year.

The EU was spooked in April by the disastrous spill from a BP oil rig in the Gulf of Mexico. The catastrophe led to calls for a wholesale revision of offshore drilling rules in the EU.

### [Will tar sands continue? Follow the money](#)

Even as the world's oil and gas companies continue to tap into Canada's oil sands, the movement against using the carbon-intensive fuel generated from them continues to grow. ForestEthics, which has been campaigning against the use of oil sands-generated fuel, says it now has 10 companies who have publicly taken action against the use of oil sands or other high-impact fuels.



## [Nuclear Boom in China Sees Reactor Builders Risk Their Know-how for Cash](#)

The ballroom of the Grand Hyatt on Beijing's East Chang An Avenue was packed. The occasion: the first-ever China International Nuclear Symposium, a gathering of China's top nuclear players and the world's nuclear power companies, including Westinghouse, Areva SA, and Hitachi-GE.

What brought the Chinese to the Hyatt on Nov. 24 and 25 was a hunger for the latest technology, Bloomberg Businessweek reports in its Dec. 6 issue. What brought the foreigners was money: According to Michael Kruse, consultant on nuclear systems for Arthur D. Little, the Chinese are ready to spend \$511 billion to build up to 245 reactors.

## [The cost of nuclear power is debatable](#)

WE ARE being softened up on the virtues of nuclear power, and the hand - no, the fist! - of the Energy Minister, Martin Ferguson, is evident.

On Wednesday he released a study by the Australian Academy of Technological Sciences and Engineering, which found that by 2040 nuclear reactors will be cheaper than solar thermal, or coal-fired power plants with carbon capture and storage - assuming a carbon price rising to \$US90 a tonne and Australian electricity prices almost tripling to \$112 a megawatt-hour.

## [Beebe: No general revenue for highway improvements](#)

LITTLE ROCK, Ark. (AP) -- A group that's trying to find ways to raise millions of dollars to improve Arkansas' highways got an unequivocal "no" from Gov. Mike Beebe on Thursday to its suggestion that state general revenue be diverted to road construction.

Arkansas has a per-gallon gasoline sales tax of 21.5 cents, which is devoted to highway funding. Beebe said he understands that revenue from the tax has declined as motorists drive more fuel efficient vehicles, while at the same time highway construction costs have been rising.

## [Pondering new breed of 'clean' energy vehicles](#)

Perhaps no technology will transform society in the coming years as much as that related to personal transportation, since transportation is one of the most pervasive factors playing a negative role on the atmosphere.

How to provide choices and flexibility to mobility needs is a question many have for a long time. A sign of our times is that peak-oil and economic uncertainty has plunged the automobile industry into a state of flux, and that soon the internal combustion engine will be obsolete, the question is: What's next?

## [If the \\$30 Billion We Give Oil Sands Went to Green Energy](#)

Many Canadians are surprised to learn they are paying more than half of the cost for all the natural gas consumed at the Alberta oil sands through tax and royalty write-offs -- \$1.7 billion this year alone. With gas prices and consumption predicted to balloon in coming years, what will be the collective cost to the taxpayer in the next decade for turning gas into bitumen? And what else could we do with this money?

## [Change is Upon Us, Part 2: Peak Oil](#)

Peak Oil. You may have heard of this term before, as it's been slowly creeping into mainstream consciousness over the past 10 years or so. The concept, although not difficult to understand, is still often poorly understood, often due to it being misrepresented by those who have a continuing vested interest in denying that peak oil is happening.

## [Climate change clock winds down](#)

Most of our transport planning is still based on the implicit assumption that we will always have cheap petroleum fuels. The orgy of building roads, tunnels and bridges in cities like Brisbane is a spectacularly misguided use of scarce resources.

We should be assessing transport schemes now to see how sensible they will look when fuel prices rise to \$5 a litre, as they are likely to be within a decade, or \$10 a litre, as they could be by 2025.

## [How Bulk Buyers Can Save Local Farmers](#)

Farmers here send produce south to Toronto by the tractor-trailer load. They have no interest in farmers' markets or buying clubs. But even for large-volume producers, it's difficult to stay in business. Prices haven't kept pace with the cost of everything else and it's getting hard to compete with imports.

Reaume is the executive director of the Holland Marsh Growers Association, which formed in 2008 with funding from the Ontario Greenbelt Association, to try and capitalize on a growing interest in local food and access new markets willing to pay a premium for made-in-Ontario produce.

## [PCON Film Series Links Oil Dependence and Food Production](#)

As part of the Peace and Conflict Studies (PCON) film series, last Monday evening, the

Peace and Conflict Studies department sponsored a movie, "Crude Impact," that highlighted the need for energy consumption reduction and traced oil's role in global conflict. The event in Golden Auditorium argued of the severity of problems caused by fossil fuels.

Even though the movie is a bit outdated, it has a large amount of pertinent information. For example, the movie asserts that agricultural growth caused exponential population growth which has led to an unsustainable demand of fossil fuels. By managing population growth, the world's energy can be better handled. The movie also points out that educated women have less children. So, promoting women's rights across the world leads to at least two benefits: a more sustainable population and a set of rights for women.

### [Reform Comes Knocking at Railroad Commission](#)

Texas has three railroad commissioners, who are elected statewide. They regulate oil and gas, which you'd never know from their title. But that's not the only reason there's a serious effort afoot to change the agency's name and replace those officeholders with part-time gubernatorial appointees, as there are at most of the state's other regulatory agencies.

Another, bigger reason is that there are lily pads and launch pads in Texas government, and the Railroad Commission is a launch pad. Being a railroad commissioner is less an end than a means — a way to propel yourself into a better, more high-profile and more powerful job.

The Texas Railroad Commission was established at the end of the 19th century as an effort to regulate trains, but it morphed into the biggest player in world energy pricing. OPEC was modeled on the agency's control of Texas oil well production, which limited supply and kept up prices worldwide.

### [Taking Square Aim at Critics, E.P.A. Marks Its 40th](#)

In the summer of 1970, President Richard M. Nixon consolidated the anti-pollution enforcement powers of 15 federal departments into a single new entity, the Environmental Protection Agency. "We're going after the polluters," William D. Ruckelshaus, the agency's first director, said after his nomination to the post. "All of them."

The agency, which officially opened its doors on Dec. 2, 1970, turned 40 years old on Thursday. It has a long history of successful battles against polluters, from its regulation of acid-rain-causing sulfur dioxide emissions to its bans on leaded gasoline and the toxic pesticide DDT.

### [Special Report - Making forests pay in a warming world](#)

SEMPIT, Indonesia (Reuters) - Deep in the flooded jungles of southern Borneo, muddy peat oozes underfoot like jello, threatening to consume anyone who tries to walk even a few yards into the thick, steaming forest.

Hard to imagine this brown, gooey stuff could become a new global currency worth billions a year, much less an important tool in the fight against climate change.

Yet this is a new frontier for business, says Bali-based consultant Rezal Kusumaatmadja, and a new way to pay for conservation efforts in a world facing ever more pressure on the land to grow food and extract timber, coal and other resources.

### [Deforestation Slows as Brazil Chugs Toward a Goal](#)

While many countries are somewhat stalled in their efforts to reduce greenhouse gas emissions, Brazil has been making progress, in large part by combating deforestation of the Amazon. President Luiz Inácio Lula da Silva has helped Brazil brand itself as one of the greener large developing countries.

This week Mr. da Silva, whose term ends at the end of the month, announced that deforestation of the Amazon had dropped to about 2,500 square miles a year. That's about half of what it was two years ago and a third of what it was in 2000.

### [As Biodiversity Declines, Disease Flourishes](#)

A study by a group of biologists, ecologists and medical researchers casts new light on a phenomenon farmers have known for years: the less genetic variety in a crop or a herd, the greater the risk that disease will decimate it. Biodiversity in ecosystems, the scientists report in the Thursday's issue of the journal Nature, dampens a pathogen's ability to spread among humans.

### [Climate: UN report highlights ocean acidification](#)

CANCUN, Mexico (AFP) – Carbon emissions from fossil fuels may bear a greater risk for the marine environment than thought, with wide-ranging impacts on reproduction, biodiversity richness and fisheries, a report at the UN climate talks here on Thursday said.

### [EU loans China half a billion euros for climate change measures](#)

Luxembourg/Beijing - The European Union's financial arm on Friday loaned China half a billion euros (660 million dollars) to reduce its greenhouse gas emissions.

### [China Turns Negotiating Tables on U.S. at Stalled Cancun Climate Meeting](#)

The U.S. pressed China to do more at climate-change talks in Copenhagen last year. Now, as the U.S. falls short of its own goals, China may have gained more credibility in renewed negotiations by moving to clean up its energy industry.

"It used to be thought that China wouldn't act until the U.S. took leadership," Mark Fulton, a managing director at Deutsche Bank Climate Change Advisors in New York, said in an interview. "But unless I've missed something, China has already taken substantial action."

### [Are we freezing because of global warming?](#)

But before we write off our current cold snap as the British weather playing its usual tricks, we still need to explain why the Arctic high pressure has strayed so far south. And here, says Prof Maslin, is the more likely, and more subtle, link with climate change. "For me," he says, "this shows that the climate is becoming more dynamic, and thus large shifts in the wind patterns are possible – in this case, sub-tropical air being trapped further south than usual."

### [Climate change can't be stopped. So adapt to it](#)

But hey, if you're confused, that's where the smart money is: it's real, it's happening, and we're not going to stop it. And snow in early December won't make a blind bit of difference to that.

### [Growth of flood claims linked to climate change](#)

Canadian insurance companies are facing unprecedented growth in claims and payouts for water-related home damage, and industry experts lay the blame squarely on climate change.

..."For most of the country, the infrastructure is not built for the climate that we are now starting to see," argued Brock Carlton, the federation's CEO.

### [Four Degrees and Beyond Special Issue Journal](#)

Tyndall Centre brings the latest climate change research to the UN Summit in Mexico. The Tyndall Centre for Climate Change Research is a major contributor to a specially themed '4 degrees and beyond' edition of the Royal Society's prestigious journal Philosophical Transactions A.

The special edition was released today to coincide with the start of the UN climate change summit in Cancun, Mexico. To enable the widest dissemination to climate change policy makers and non-academics, the papers in this normally specialist journal are open access and free to download

The collection of papers by leading international scholars from the Tyndall Centre, Oxford University, the Met Office and overseas institutes, explores the likelihood of large climate changes of 4 degrees and the potential impacts of these changes. The research addresses the challenges involved in avoiding high levels of warming, as well as the challenges of adaptation should society fail to do so. It stems from the first academic conference to analyse 4 degrees and beyond, last year by the Tyndall Centre.



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