Bloomberg BRIEF

Climate & Carbon

FROM BLOOMBERG NEW ENERGY FINANCE

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MONDAY

Lloyd's Insurer Selling Policy Against EU CO2 Flip Flop

BY MATHEW CARR

A **Lloyd's of London** insurer is offering carbon traders coverage that would pay out if the European Union changes its mind again on the emission credits it will accept in its cap-and-trade market, the world's largest.

Kiln Group Ltd., a Lloyd's insurer owned by **Tokio Marine Holdings Inc.** of Japan, began selling policies last month that may pay traders in the event European regulators propose or pass new eligibility rules, said **Julian Richardson**, chief executive officer at **Parhelion Underwriting Ltd.**, an adviser to Kiln.

"We can define the trigger" to suit the premium the client is willing to pay, Richardson said. A regulatory proposal would usually come several months before rules take effect in the market.

Eligibility risk insurance might cost about 3 percent to 8 percent of the sum insured, Richardson said. The price might be higher for policies covering more risk, he said.

The European Commission proposed a ban starting in May 2013 on credits from projects that cut hydrofluorocarbon-23, a greenhouse gas that can trap 11,700 times more heat per molecule than carbon dioxide, to curb "exorbitant" returns. The ban will probably become law later this year, based on usual timeframes for approval by regulatory bodies including the European Parliament.

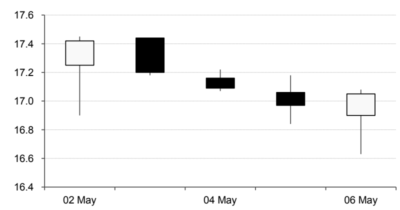
"We want the clients to tell us what keeps them awake at night," said **Thomas Hoad**, underwriter in the enterprise risks division of Kiln. The policies "will encourage more investment in climate-change projects."

Kiln sold last month what it calls the world's first carbon-credit-eligibility risk product to an unspecified international bank, it said.

MARKETS

	PRICE	WEEK CHANGE
BCARX PII/III demand	1912	+0.11%
Dec11 EUA (e/t)	17.05	-0.53%
Dec11 CER (e/t)	13.03	-0.76%
Dec11 CER-EUA spread	4.02	+0.25%
RGGI V09 Dec11	1.94	0.00%
Front Month Brent ($/bbl)	109	-13.31%
2012 ARA Coal ($/t)	128	-3.58%
SU11 UK NBP (p/th)	68.9	-3.63%
2011 DE base (e/MWh)	58.4	-1.35%

EU CARBON PRICE PER METRIC TON



Contents | Page

Climate scientist **Paul Williams** tells Climate & Carbon he is on a quest for the 'Holy Grail' of climate change research.

See Carbon Insider on Page 7

CARBON MARKET REPORT CATHERINE AIRLIE

CO2 Permits Fall as Slow Economy May Sap Demand

European Union carbon permits fell last week, tracking losses in the broader commodity markets after crude oil traded below $100 a barrel and Central Bank President **Jean-Claude Trichet** signaled slow economic growth.

"There were drops across all commodities," **Andrew Ager**, the London-based head of carbon and emissions at **Prudential Financial Inc.**'s **Bache Commodities Ltd.**, said. "Trichet wasn't as hawkish as we expected on interest rates. That could be a sign the outlook for growth isn't strong and the economy is ticking along in a precarious state and we might see a weakening of some sectors."

EU emission allowances for December finished the week 0.5 percent down and traded as low as 16.63 euros ($24.08) a metric ton on London's ICE Futures Europe exchange. That was the lowest level since April 19. The contract traded as high as 17.45 euros last week as power utilities bought to hedge forward sales of electricity.

Factories and power stations under the European Union's emissions trading system use the allowances to comply with carbon-dioxide limits. Prices can track oil markets, as they give an indication of future industrial productivity.

Crude oil tumbled in New York last week in the biggest decline in two years on concern that economic growth and fuel demand will drop. Some natural-gas contracts are linked to oil prices and so declines can lead to a switch in fuel for power generation. Burning gas emits about half the carbon dioxide of coal. The premium of EU permits for 2013 over 2012 widened this week to 1.45 euros on May 3, its biggest gap on a closing basis since September 2009, exchange data show.

SCIENCE, INTERNATIONAL POLICY

Profitable Tree Projects May Curb Climate Change, UN Says

The world's forests may spur financial rewards and risk management opportunities as a way to curb climate change, according to the United Nations.

Tropical forests are disappearing at a rate of about 13 million hectares (32 million acres) each year, or an area the size of Greece, equivalent to the release of six billion metric tons of carbon dioxide into the air, according to a United Nations Environment Program report published May 6. That's 8.5 times the emissions of all of Europe's power stations and factories under the bloc's cap-and-trade program.

Financing tree projects that create carbon credits can be profitable, reduce risk portfolio diversification, and cheapen compliance costs for emitters, the UNEP said in the report entitled "Reddy Set Grow," in a reference to Reducing Emissions from Deforestation and Degradation, or REDD. The document outlines the role of banks, insurers and investors in forestry carbon markets. Trees absorb carbon dioxide for growth and release it when they rot or burn.

BNP Paribas SA and **Wildlife Works Carbon LLC** said Sept. 21 they plan to develop credits from REDD projects in Africa. BNP Paribas committed as much as $50 million of finance for such activities.

Credits from planting trees account for only 1 percent of the UN's Clean Development Mechanism, a program that accredits emissions cutting projects with tradable certificates for use by companies and nations to comply with limits. That compares to forestry projects making up as much as 24 percent of voluntary markets, according to the report. The forest-related carbon market was worth $37 million in 2008, or 0.03 percent of total global markets, data in the report show.

International talks held last year in Cancun, Mexico, considered ways of creating carbon forestry credits, which may be part of a new climate treaty. About 200 nations will meet in Durban, South Africa, in December to carve out a role for forests as a means of emissions reduction.

Brazil, Indonesia, Nigeria and the Democratic Republic of Condo may be top producers of REDD credits, according to **Barclays Capital**.

– Catherine Airlie

Climate Change Reduced Wheat, Corn Yields, Researchers Say

Climate change reduced wheat and corn yields from 1980 to 2008, U.S. researchers said in a study published in the journal Science. World wheat production was 5.5 percent lower in that span than it would have been without any change in temperatures and rainfall, the researchers said. Corn output fell 3.8 percent compared to a model without a changing climate.

"According to the authors, the drop-off in production may be responsible for the 6 percent rise in food prices since 1980," Science said. "That's a $60 billion a year jump in what consumers paid for food."

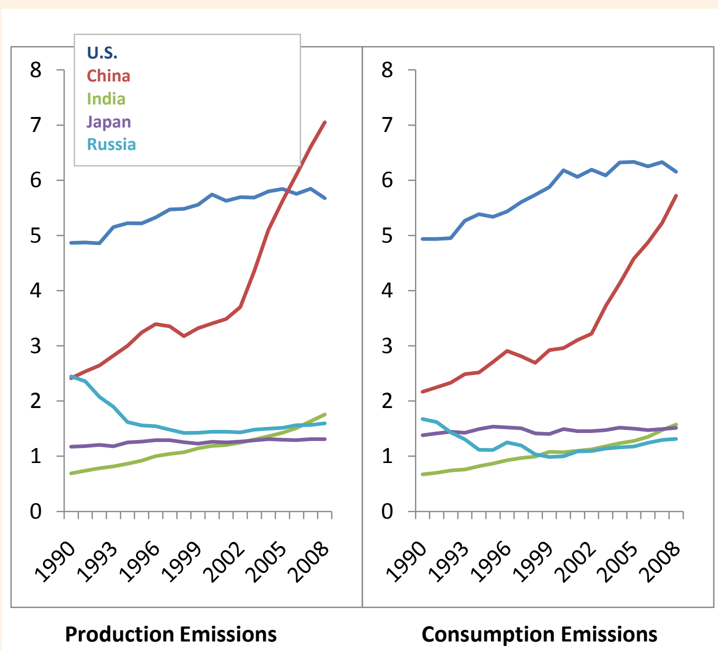
World food prices rose to near a record in April as grain costs increased, according to the United Nations' Food and Agriculture Organization. Corn and wheat prices more than doubled in the past decade in Chicago trading.

The yield gap was calculated by David B. Lobell from Stanford University, Wolfram Schlenker at Columbia University and Justin Costa-Roberts of the National Bureau of Economic Research.

– Rudy Ruitenberg

U.S. Leads China in Carbon-Dioxide Emissions

These charts show carbon emissions measured per annum in billion tons for five countries between 1990 and 2008. The chart on the left illustrates production-based emissions, while the chart on the right chart represents the CO2 cost of goods imported into each country minus the CO2 cost of goods that are exported. From a production-based perspective China is the world's largest emitter of CO2 emissions, but the U.S. takes the top spot when the carbon footprint of imported goods is considered. Similarly, Japan and Russia swap positions when shifting from a production to consumption-based system. The research was conducted by Glen P. Peters, Jan C. Minx, Christopher L. Weber and Ottmar Edenhofer and published in the journal Proceedings of the National Academy of Sciences.



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NATIONAL POLICY

POLICY MAKER'S CALENDAR

- 3rd LatAm Mid-East Investors Forum
Abu Dhabi May 9-10

- Wind Power Mexico
Mexico City May 12-13

- Hydrogen and Fuel Cells 2011
Vancouver, British Columbia May 15-18

- Forum CanalEnergia: Leiloes 2011
Rio de Janeiro May 18

- China Green Transport Summit & Expo
Sanya, Hainan May 24-25

- PCH 2011 (Small Hydropower)
Sao Paulo May 24-25

- CSRAmericas 2011
Asuncion May 24-26

- Biorefining for Pulp and Paper
Barcelona May 24-26

- Carbon Trade China 2011
Beijing May 25-26

- China Offshore Wind Power Summit
Shanghai May 26-27

- Bright Green Cities
Rio de Janeiro May 31-June 3

EU Carbon Emissions Permits Plan May 'Kill Off' Polish Companies

European Union regulations that will allocate free carbon-dioxide permits to companies in the next phase of the world's biggest emissions trading system may "kill off" Polish coal-dependent companies, an official said.

The methodology chosen by the European Commission, the EU's regulatory arm, is illegal and discriminates against coal-based energy production, said **Zbigniew Kamienski**, deputy director at the economic development department of Poland's Economy Ministry.

The commission last month adopted 52 carbon efficiency benchmarks for distributing a dwindling supply of free emissions allowances to companies from 2013 to 2020.

"The regulation threatens to kill off even the most modern and energy-efficient companies in Poland simply because the energy they use is based on coal," Kamienski said. "The method employed by the commission violates the basic European principle of proportionality."

While the EU has given away the majority of emissions permits, it will sell the majority of them in the next phase. The allocation of free allowances will be done through benchmarks based on the average performance of the top 10 percent of installations in 2007 and 2008.

The most efficient installations in a given industry won't need to purchase more allowances, while those that emit more than the benchmarks will need to buy permits.

The benchmarking regulation has also come under fire from steel producers, who claimed it will result in additional costs to the industry of around 5 billion euros.

Eurofer, whose members include the world's largest steelmaker **ArcelorMittal** and Germany's largest steel producer **ThyssenKrupp AG**, said last month it would initiate legal action against the commission. Poland may follow suit, Kamienski said.

– Ewa Krukowska

IETA Opposes Release of Data on Bidders in U.S. Carbon Auctions

Publication of data on bidders in the auction of carbon allowances in the U.S. Regional Greenhouse Gas Initiative may allow market manipulation, said the International Emissions Trading Association.

The Geneva lobby group said it supports the New Jersey Attorney General's motion to dismiss a claim that the RGGI auction information be released in response to a Freedom Of Information Act request, according to a statement on the IETA website dated May 3.

"IETA has concerns that releasing specific information about bidders could adversely affect participants, facilitate market manipulation, and make RGGI allowance auctions less competitive," the lobby group said.

– Mathew Carr

Estonia Sold 75% of Spare UN Carbon, Prime Minister Says

Estonia has disposed of about 75 percent of its 85 million metric tons of spare carbon permits awarded under a United Nations program in sales totaling 360 million euros ($534 million), Prime Minister **Andrus Ansip** said.

Estonia is holding talks on "several" more deals to sell spare Assigned Amount Units, known as AAUs, Environment Minister **Keit Pentus** said at a news conference with Ansip in Tallinn. The Cabinet authorized Pentus to sign an agreement to sell an undisclosed amount of permits to Spain in a deal valued at 45 million euros.

Keit Kasemets, strategy director at the state chancellery in Tallinn, said in March that the selloff amounted to "somewhat more than" 60 percent of total after the country had signed the previous three deals with Japan's **Mitsubishi Corp.** and **Sumitomo Mitsui Banking Corp.**

– Ott Ummelas

BUSINESS & ENVIRONMENT

Power Companies May Need $40 Billion to Meet EPA Rule

Southern Co. and **Duke Energy Corp.** are among power companies facing a combined $40 billion in costs by 2016 under a proposal aimed at reducing toxic emissions such as mercury at coal-fired plants, according to data compiled by Bloomberg.

The projection is based on a U.S. Environmental Protection Agency analysis of equipment needed to meet the rule, which the agency said will help cut power-plant mercury emissions to about 90 percent below 2005 levels.

The EPA said the rule affects about 1,200 coal-fired electricity generating plants and 150 oil-fired units.

Costs of retrofitting or retiring power plants will fall hardest on companies most dependent on coal-fired generation. Duke, Southern, **American Electric Power Inc.** and the **Tennessee Valley Authority** are likely to have multibillion-dollar costs, according to a Bloomberg Government Briefing by analysts Marisa Buchanan and Rob Barnett. **Alstom SA** and **Babcock and Wilcox Co.** may benefit, according to the briefing.

The rule would require many power plants to install "widely available, proven pollution control technologies" to cut emissions, the EPA said in March. The agency estimated health and economic benefits of as much as $140 billion a year.

– Joe Richter

Masdar Registers Kafr el-Dawar Project for CO2 Credits

Masdar, the Abu Dhabi government-owned renewable energy company, registered the Kafr el-Dawar project in Egypt under the United Nations Clean Development Mechanism.

The project will switch the fuel used by the **Spinning, Weaving and Dying Co.** in Kafr el-Dawar near Alexandria from heavy fuel oil to natural gas, reducing carbon emissions, the company said in a statement.

Once approved, the project would receive tradable carbon credits, according to the statement. It is one of only 23 CDM projects registered in the Middle East and North Africa, the statement said. Masdar Carbon registered the project with **TriOcean Carbon**, a Cairo-based energy company.

– Ayesha Daya

E.ON Says Energy Debate Makes Forecast 'Difficult'

E.ON AG, said gauging earnings this year is difficult because of the government's debate over accelerating its exit from nuclear power after the disaster in Japan.

"The ongoing energy policy debate renders our current-year forecast difficult," **Johannes Teyssen**, E.ON's chief executive officer.

German Chancellor **Angela Merkel** has put an extension of nuclear energy under review and ordered a three-month halt of the country's oldest reactors for checks. Two plants operated by E.ON will be shut for the checks.

"For now, all statements must be based on the assumption that our demonstrably safe nuclear power stations will be allowed to return to service after the moratorium," Teyssen said.

While E.ON can't yet quantify those consequences, German policy decisions could result in "a re-evaluation that would encompass all our performance figures and targets," he said.

The company will consider its options for building U.K. nuclear power plants with **RWE AG** after a national regulator releases a report on safety in September, Teyssen said. E.ON's smaller German competitor RWE said last month that it doesn't expect to take a decision on investing through the **Horizon Nuclear Power Ltd.** joint venture with E.ON in the "short term."

The company expects adjusted earnings before interest, taxes, depreciation and amortization to fall to 11.2 billion euros to 11.9 billion euros ($17.6 billion) this year from 13.3 billion euros in 2010. Adjusted net income, which the utility uses to calculate its dividend, will fall to 3.3 billion euros to 4 billion euros from 4.9 billion euros last year, he said, confirming E.ON's forecast.

– Nicholas Comfort

SHARE PRICES OF UTILITY EMITTERS IN EUROPE

COMPANY	5/6/2011	4/29/11	WEEKLY CHANGE	% CHANGE
RWE AG	43.72	44.055	-0.335	-0.76%
E.ON AG	21.605	23.08	-1.475	-6.39%
ENEL SPA	4.662	4.814	-0.152	-3.16%
EDF SA	28.44	28.425	0.015	0.05%
PUBLIC POWER CORP SA	11.1	11.17	-0.07	-0.63%
GDF SUEZ	26.715	27.625	-0.91	-3.29%
CEZ AS	938.5	936	2.5	0.27%
IBERDROLA SA	6.272	6.27	0.002	0.03%
ENI SPA	17.47	18.05	-0.58	-3.21%
TAURON POLSKA ENERGIA SA	6.14	6.2	-0.06	-0.97%
EDP SA	2.72	2.76	-0.04	-1.45%
DRAX GROUP PLC	445.5	443	2.5	0.56%

Note: Market price is shown in local currency

SHARE PRICES OF INDUSTRIAL EMITTERS IN EUROPE

COMPANY	5/6/2011	4/29/11	WEEKLY CHANGE	% CHANGE
ARCELORMITTAL	24.835	24.84	-0.005	-0.02%
TOTAL SA	41.61	43.22	-1.61	-3.73%
TATA STEEL LTD	594.5	616.5	-22	-3.57%
HEIDELBERGCEMENT AG	49.52	51.63	-2.11	-4.09%
ROYAL DUTCH SHELL PLC	25.175	26.08	-0.905	-3.47%
EXXON MOBIL CORP	82.69	87.98	-5.29	-6.01%
LAFARGE SA	45.67	47.775	-2.105	-4.41%
ITALMOBILIARE SPA	18.4	18.5	-0.1	-0.54%
BP PLC	454.7	462.55	-7.85	-1.70%
HOLCIM LTD	71.5	75.3	-3.8	-5.05%
STATOIL ASA	144.5	153.5	-9	-5.86%
REPSOL YPF SA	23.225	24.11	-0.885	-3.67%

Note: Market price is shown in local currency

CARBON MARKET COMMENTARY

Weekly commentary from Bloomberg New Energy Finance

EU Carbon to Recover From Oil Shock

BY MATT COWIE, BLOOMBERG NEW ENERGY FINANCE

The price of EU carbon allowances, EUAs, fell below €17.00 last week, as other commodity markets retreated over U.S. economic growth concerns. EUA and German power prices outperformed the wider energy complex, a sign there is a bullish sentiment for European carbon assets. With the EUA December 2011 contract closing above €17.00 on Friday, we expect the EUA market to be weakly bullish this week and to trade between €16.80 and €17.50. Should Brent crude continue its drop, the EUA December 2011 price might fall as low as €16.50.

COMMODITIES TUMBLE

Commodities retreated on Thursday after jobless benefit claims in the U.S. increased. The rise of the U.S. dollar amplified the pressure on Brent crude prices with the front-month contract losing 8.6 percent on Thursday. Following a low on Friday, commodities bounced back, and the wider energy mix is expected to recover this week. The fall in commodities appears to have been event-driven, while fundamentals are forecast to remain strong.

TRADING RECOVERED

BlueNext EUA spot contracts increased by €0.59 on Tuesday following the introduction of the platform's 'safe harbor' initiative, closing at a record high of €16.97. The initiative aims to tackle fraud by tracing units back to their original source before allowing them to be traded. The EU has proposed tougher regulation for carbon trading from 2013 when the common registry starts operating. Measures, proposed in a draft released on Thursday, include a 24-hour delay in transfer of allowances, and harmonized alert mechanisms in case of emergency. Traders considered the measures taken may help to recover trust in the spot market and trading volumes is expected to recover.

NUCLEAR DEBATE

In advance of E.ON's annual shareholder meeting its chief executive said May 5 that E.ON will meet its earnings projections for 2011 assuming its two closed nuclear stations in Germany reopen in June. If Germany extends the closures and opts for an earlier phase-out of nuclear, E.ON indicated significant consequences on company forecasts.

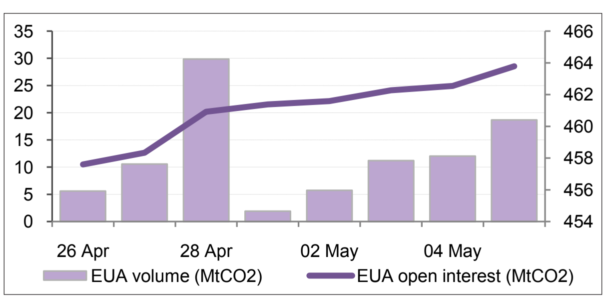
If the stations do not reopen in June, it will have a bullish effect on carbon prices as the triggered shift to fossil-fuel energy would boost demand for EUAs.

Politically, it is easier for company executives to state publicly they believe the plants will reopen regardless of their actual expectations.

MARKET ACTIVITY LAST WEEK

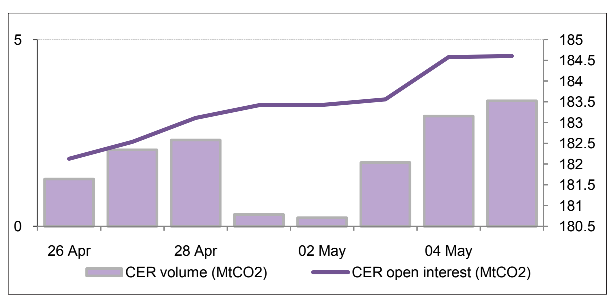
DAY	EUA	SPREAD	CARX	COMMENT
MONDAY	17.42	4.08	1908.11	U.S. makes announcement on death of Osama bin Laden
TUESDAY	17.20	4.07	1905.74	BlueNext launches "safe harbor" plan to enhance EU carbon security
WEDNESDAY	17.09	4.01	1896.45	European Commission meeting on carbon market oversight
THURSDAY	16.97	3.96	1901.48	Stop losses triggered as EU carbon falls below 17 euros, oil falls under $100
FRIDAY	17.05	4.02	1912.81	German power reaches its weekly low of 57.50 euros

EU Carbon Trading Volumes



Source: EMIS <GO>

UN Carbon Trading Volumes



Source: EMIS <GO>

INSIGHT

Excerpts from Bloomberg New Energy Finance Research

UN Offsets Post 2012: What the Market is Saying

Investing in the United Nations' Clean Development Mechanism Carbon offset scheme post 2012 remains a risky business. This remains the case even as credit eligibility for the European Union Emissions Trading Scheme's next trading period becomes a little clearer. This Research Note reveals the results of our latest price survey of UN Certified Emission Reduction credits and discusses how the market is assessing and managing post-2012 risks.

- Overall, our results indicate that participants have more confidence in the post-2012 market than they did with last year. The improved outlook is reflected in increased participation in the post-2012 market and a higher average expected price for secondary CERs in 2020 of 25 euros a metric ton compared to 19 euros a metric ton in last year's survey.

- This improved confidence is likely to reflect the positive signals from Cancun regarding the future of the Kyoto mechanisms and greater clarity surrounding the EU ETS eligibility restriction.

- In addition, the approaching 2012 deadline increases the pressure on credit off-takers to boost their engagement with the post-2012 market. This is because off-takers commonly contract projects early in the approval cycle and projects submitted for validation today are unlikely to reach issuance before the close of 2012.

- The average price discounts for forward contracted primary CERs suggested by respondents across technologies and host countries have remained largely unchanged from last year's report, at 48 percent and 33 percent respectively. Respondents still consider certain industrial gas projects to carry the highest post-2012 risk from a technology perspective, and China and India are seen as the most risky host countries.

- More than ever primary CER purchasers are now focusing on meeting preferences of the EU market. In the light of last year's policy developments in the US, Japan and Australia, there is little hope that demand for CERs will come from these countries out to 2020.

- Technology restrictions are still considered the key post-2012 risk factor by primary CER off-takers, and the wide range of discount factors applied by respondents across different project types illustrates the remaining high levels of uncertainty on the EU's final ruling.

- The analysis is based on feedback from a survey conducted by Bloomberg New Energy Finance among CDM market players in March 2011. This year's analysis focuses on the private sector, with 12 respondents from market intermediaries and five from private compliance buyers. The survey comprised seven questions on the players' post-2012 risk perception.

(from Bloomberg New Energy Finance Research Note published on March 29)

IN BRIEF

Italian RECs: How Not to Kill a Green Certificate

At the end of March, Italy's Renewables Decree came into force, setting out the timetable for the phase-out by 2015 of its REC scheme and its replacement with a feed-in tariff.

Bloomberg New Energy Finance says REC prices are likely to decline towards a floor created by purchases by the transmission system operator.

Priced High Down Under: Levelised Costs of Energy

Australia has its excellent resources for renewable energy, better-than-average capacity factors and lower taxes.

Bloomberg New Energy Finance estimates that levelised costs of energy are at least 15 percent more expensive in Australia at current exchange rates, and identifies expensive equity, debt and labour as among the reasons for this gap.

Development Bank Finance for Clean Energy Projects

Development banks have helped to support economic activity since the credit crunch, with clean energy one of the sectors benefiting most.

This Research Note finds that In 2010 they provided over $13 billion in renewable energy project finance globally, and identifies the European Investment Bank and Brazil's development bank, BNDES, as the two biggest financial institutions involved.

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CARBON INSIDER – COMMENTARY

Climate scientist Paul Williams speaks with Climate & Carbon

Mankind Can Still Prevent Dangerous Global Warming

Paul Williams, climate scientist at the **University of Reading**, has spent eight years studying atmosphere and ocean and researching their impacts on the climate. Now, he speaks with Agnes Teh of Bloomberg New Energy Finance about the debate surrounding climate modeling and the Holy Grail every climate scientist aims to crack.

Q. There has been much talk about the accuracy of climate models to predict climate. Can we really trust them?

A. At the heart of a climate model is simply the same rules of physics that predict the timing of eclipses long in advance – with great precision. Skeptics might say, "Well, okay, that's true but you can't solve the equations exactly when using the computer model, even if the physics is right." Scientists respond that the models pass various stringent tests of their simulation ability. The argument goes back and forth. But the evidence that the twentieth century rise in temperature has been caused by the post-industrial rise in carbon dioxide is compelling.

Q. Scientists at the Tyndall Centre argue there is little chance of limiting global warming within the 2 degrees Celsius target of the Copenhagen Accord. Do you agree?

A. We are capable of stopping the rise. I think Bloomberg is on target to cut CO2 emissions by 50 percent between 2007 and 2013. If everyone did that in the U.K., then we would have cut our emissions. But if global emissions cannot be cut in time, there are some ideas about artificially 'geo-engineering' the clmate. We could put big mirrors up in space to block out sunlight, cover the Sahara desert with reflective material, or spray sea salt into the atmosphere to make clouds – these have all been taken quite seriously as a 'Plan B" in case emissions cannot be cut, but they remain controversial and untested.

Q. In 2009, hackers exposed emails by scientists at the University of East Anglia's Climate Research Unit discussing ways to keep skeptics' research out of peer-reviewed journals. Since then the U.K's House of Commons' Science and Technology Committee found no evidence to support the charges. Do you think that wounds still remain in the climate science community?

A. My view is that a small number of climate scientists used some misguided short-hand phrases in some private emails. But, as various inquiries have subsequently found, it is nonsense to think that this brings down the whole of climate science, which is built upon countless independent lines of evidence. My view as an editor of a top journal is that peer review almost always prevents flawed work from being published, and it almost always permits correct work to be published. There is no alternative.

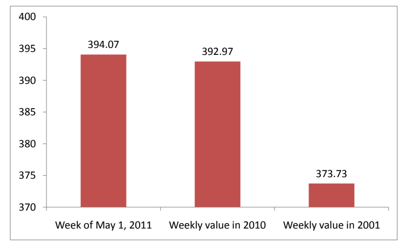
Q. Lastly, tell us about this Holy Grail that you've been trying to crack.

A. Centuries ago, British physicist George Stokes and French mathematician Louis Navier came up with the Navier-Stokes equation to explain the motion of fluids. If we could exactly solve this equation and the accompanying equations that describe clouds and atmospheric radiation, then we would know what the climate would be a hundred years from now. It is the Holy Grail. It is what I do but it's very hard and no one's cracked it, yet.

Since 2010 Paul Williams has served as an editor for Geophysical Research Letters, a journal which publishes scientific advances of geophysical impact. An Oxford graduate with a first-class physics degree and PhD in atmospheric and oceanic physics, Williams also lectures in climate science at Reading University.

ATMOSPHERIC CO2

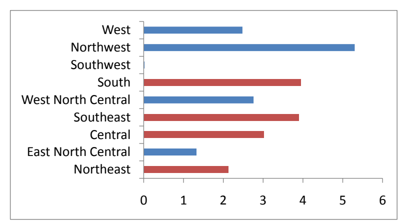
This chart shows the previous week's average atmospheric concentration of carbon dioxide measured in parts per million at the Mauna Loa Observatory in Hawaii. CO2 concentration levels are increasing at an accelerating rate decade to decade. Scientists believe returning to an atmospheric CO2 concentration below 350ppm is needed to avoid runaway climate change. The data for this chart was obtained from the National Oceanic & Atmospheric Administration/Earth System Research Laboratory.



Source: NOAA/ESRL

TEMPERATURE CHANGE

This chart shows average temperature anomalies in degrees Fahrenheit for nine U.S. climate regions for the week of April 24. The weekly temperature anomaly is based on its departure from normal weekly temperatures from 1971-2000. Bars in blue indicate lower than normal temperatures, while bars in red indicate higher than normal temperatures. The data for this chart was obtained from the National Climatic Data Center and the National Oceanic & Atmospheric Administration's Climate Prediction Center.



Source: NCDC/NOAA

GLOSSARY

■ 2 degrees Celsius

In order to avoid dangerous climate change, scientists have argued warming compared to pre-industrial times should not exceed 2 degrees Celsius.

■ Geo-engineering

Technologically altering nature to counteract global warming effects.