THE CARBON SEQUESTRATION NEWSLETTER

http://www.netl.doe.gov/sequestration

October 2005

- Sequestration in the News
- Events and Announcements
- Recent Publications
- Legislative Activity

Sequestration in the News

***The Australian,* Gorgon Project Reaches Environmental Impact Statement (EIS) Stage**. A 2,500-page EIS for the Gorgon Project off the West Australian coast has been released and is open for public comment until November 21, 2005. To download the document in PDF format visit http://www.gorgon.com.au/03moe_eis.htm. The Gorgon project proposes to capture CO_2 from produced natural gas (14% CO_2) and inject it into a geologic formation. CO_2 capture and sequestration will reduce the projects GHG emissions from 6.7 million tons of CO_2 equivalent per annum (MTPA) to 4.0 MTPA. The EIS addresses three main issues: quarantining Barrow Island from the introduction of plants and animals from outside; the impact of dredging a 70km pipeline from the Gorgon gas fields; and the challenge of disposing of carbon dioxide. Regarding the geologic sequestration component, the EIS states, "The probability of CO_2 migrating to the surface has been determined to be remote, with potential environmental consequences limited to localized impacts on flora and possible detrimental impacts on subterranean fauna." "Radical method may bury gas plant," September 13, 2005, http://www.theaustralian.news.com.au/common/story_page/0,5744,16583997%255E30417,00.html

***PWR Newswire,* "FutureGen Industrial Alliance Announced."** A coalition of the largest electric utilities and coal companies in the United States announced that they have created the FutureGen Industrial Alliance, a non-profit company that will partner with the U.S. Department of Energy to facilitate the design, construction and operation of a 275 MW coal-fired power plant with zero emissions. The seven founding members of the FutureGen Industrial Alliance are: American Electric Power, BHP Billiton, CONSOL Energy Inc., Foundation Coal Corporation, Kennecott Energy Company, Peabody Energy, and Southern Company. The Alliance is also in discussions with other companies, both domestic and international, and expects membership to grow. September 13, 2005, http://www.prnewswire.com/cgi-bin/stories.pl?ACrCT=104&STORY=/www/story/09-13-2005/0004105900&EDATE

***Onpoint,* "DOE Official Talks About FutureGen, explains blueprint for DOE's zero-emissions coal plant."** In an interview with Darren Samuelson, Victor Der, director of the Office of Power Systems at the Energy Department, talks about the road ahead for FutureGen, negotiations with Congress over clean coal funding, and DOE's efforts to involve other countries in carbon sequestration research. Der states that the Department of Energy is in the early stages of building FutureGen, with a recent commitment by electric utilities and coal companies to pick up one-quarter of the project's cost. *E&ETV News*, September 23, 2005. You can watch video of the interview at http://www.eande.tv/main/?date=092305&page=1

***Business Wire,* "GE Energy, Bechtel Get Approval from AEP to Proceed with Plans for IGCC Project; A Milestone for Cleaner Coal Technology in the United States."** GE Energy and Bechtel announced the signing of an agreement with AEP to proceed with the front-end engineering design (FEED) phase for a proposed commercial, 629-megawatt IGCC plant to be built at a site in Meigs County, Ohio. The FEED process is expected to take 10 to 12 months. Target for commercial startup of the new IGCC plant is 2010. The new AEP facility would be the first commercial-scale, IGCC plant built in the United States since Tampa Electric's Polk Power Station came online in 1996. Says John Krenicki, Jr., president and CEO of GE Energy, "Today's announcement is a clear sign that the energy industry is ready to enter a new era of cleaner coal power plants." A press release notes that the IGCC process generates lower sulfur dioxide, nitrogen oxide, mercury and particulate matter emissions, uses less water, and can be more economically retrofitted for carbon capture than a traditional pulverized coal plant. September 29, 2005, http://home.businesswire.com/portal/site/google/index.jsp?ndmViewId=news_view&newsId=20050929005350&newsLang=en

***New York Times*, "Steps to Limit Global-Warming Gas."** Capturing and storing the carbon dioxide generated by power plants and factories could play an important role in limiting global warming caused by humans, says the Intergovernmental Panel on Climate Change (IPCC). In the Special Report on Carbon Capture and Storage (CCS) the IPCC says doing so could cut the cost of stabilizing carbon dioxide concentrations in the atmosphere as much as 30 percent compared with other options, like switching to cleaner technologies. Altogether, the report says sequestering carbon dioxide could eventually account for slightly more than half of what is needed to prevent dangerous concentrations in the atmosphere. But the report cautions that while the method is cheaper than others, it would significantly raise the cost of electricity for many years. For that reason, several authors and United Nations officials said, it is unlikely that the technique will be adopted voluntarily by industries in wealthy countries. "First there has to be a policy in place to provide the incentive" to adopt such technologies, said Bert Metz, a Dutch environmental official who was the lead author of the report. September 28, 2005, http://www.climateark.org/articles/reader.asp?linkid=46698. Also see, "Carbon dioxide storage holds limited promise: Approach could halve industrial emissions by 2050," *news@nature*, September 27, 2005, http://www.nature.com/news/2005/050926/full/050926-6.html (subscription required). A summary of the report, which was released on September 26, is available online at http://www.ipcc.ch

Sequestration in the News, Cont'd

***East Bay Express*, "Down with Greenhouse Gas."** Article highlights an upcoming geologic sequestration field test in Solano County, California's Rio Vista gas fields. The pilot projects will be overseen by the West Coast Regional Carbon Sequestration Partnership (WESTCARB). In the next year, it is expected that two thousand to four thousand tons of carbon dioxide will be purchased, trucked to Solano County, and injected into a layer of sandstone five thousand feet beneath the Earth's surface. The total effort will cost $29.9 million over the next four years, with the government contributing $14.3 million. "The Central Valley in general is a very attractive place to think about the storage of CO_2 in the subsurface," says Larry Myer, WESTCARB's technical director. Estimates show the area's rock formations could hold eighty billion to five hundred billion tons of carbon dioxide, the equivalent of hundreds of years of emissions from California's power plants and industrial sources. The Partnership will also work on terrestrial sequestration. September 14, 2005, http://www.eastbayexpress.com/Issues/2005-09-14/news/cityside.html

***Nature*, "Deadly lakes may explode again: Pipes to avert disaster are working, but not quickly enough."** This article highlights an ongoing project to remove dangerous levels of carbon dioxide from the bottom of two lakes sitting over volcanic sites in Cameroon. One of these, Lake Nyos, exploded in 1986, suffocating more than 1,700 people in the surrounding area with a plume of carbon dioxide. Nearby Lake Monoun killed about 40 people when it exploded in 1984. September 26, 2005, http://www.nature.com/news/2005/050926/full/050926-4.html (subscription required)

***BBC News*, "UK, China in cleaner power plan."** Article highlights a proposed British plan to transfer clean coal technology to China. Britain's Department of Environment, Food and Rural Affairs is proposing joint research and development between UK, European and Chinese partners – involving academic, research institutions and industry partners – leading towards a demonstration project starting up between 2010 and 2015. The article mentions the planned BP storage project in the North Sea and says a medium scale demonstration capture and storage plant is being developed by the EU in Germany and should be ready by 2008. According to the article, "the U.S. hopes to have a large-scale demo plant operating by around 2015 and EU officials hope the Chinese venture will also deliver by around the same date." September 1, 2005, http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/4204812.stm

Announcements

DOE Releases Draft Strategic Plan for Reducing GHG Emissions. On September 22, the Department of Energy released for public review and comment a plan for accelerating the development and reducing the cost of new and advanced technologies that avoid, reduce, or capture and store greenhouse gas emissions – the technology component of a comprehensive U.S. approach to climate change. The technologies developed under the Climate Change Technology Program (CCTP) will be used and deployed among the United States' partners in the Asia-Pacific Partnership for Clean Development that was announced earlier this year. The public can view and comment on the draft Strategic Plan on the CCTP website at http://www.climatetechnology.gov/
The CCTP will discuss the Plan with stakeholders at a series of workshops during the coming months. The public comment period will close on Wednesday, November 2, 2005.

DOE Announces Delay of Effective Date for the 1605b Program Revised Guidelines. On September 19, 2005, the U.S. Department of Energy's Office of Policy and International Affairs issued a Federal Register Notice announcing the delay in the effective date of the 1605b Program's Revised General and Technical Guidelines for reporting. The effective date has been changed to June 1, 2006. The Federal Register Notice is available in PDF format at
http://www.eia.doe.gov/oiaf/1605/FR-Notice09-19-05.pdf
For additional information, visit
http://www.eia.doe.gov/oiaf/1605/aboutcurrent.html

"Duke Energy Pledges $2.5 Million for Climate Change Policy Partnership." Duke Energy has pledged $2.5 million to Duke University to support the Climate Change Policy Partnership – a new industry-university collaboration that will develop policies to address the problems of global climate change. Duke Energy's gift will come in two segments: $1.5 million to fund Phase I of the partnership, expected to be completed by January 2007; and an additional $1 million to fund Phase II, which depends on the successful completion of the first phase and the recruitment of other corporate partners. Researchers will assess the environmental and economic costs and benefits of federal policy options for addressing emissions of carbon dioxide and other greenhouse gases, including market-based cap-and-trade programs and a nationwide tax on the carbon content of fossil fuels. In addition, researchers will assess the potential for using carbon sequestration to store atmospheric carbon dioxide in forests, soils or underground reservoirs. *Duke University Press Release*, September 12, 2005, http://biz.yahoo.com/prnews/050912/clm089.html?.v=9

Details on Coal-Seq IV Forum. This year's forum will be held November 9 – 10, 2005 in Denver, Colorado. Coal-Seq brings together experts from around the world to share information about their views and activities on the topic of carbon sequestration in coalseams, as well as enhanced coalbed methane recovery. They are excellent opportunities to stay abreast of the latest technology and global activities, as well as meet the leading experts in the field. Registration fees for non-members of the Coal-Seq II Consortium are US$195. For more information contact Susan Pershall at 713-780-0815 or spershall@adv-res-hou.com, or go to http://www.coal-seq.com

Science

"Heat Wave makes plants warm planet." A new study shows that during the 2003 heat wave, European plants produced more carbon dioxide than they absorbed from the atmosphere. The study also found European lands were 20 percent less productive than during an average year. During an average year, plants in Europe absorb approximately 125 million tonnes of carbon (MtC). However, in 2003, they released 500 MtC to the atmosphere. By comparison, global emissions from burning fossil fuels amount to about 7,000 MtC. The study shows that ecosystems which currently absorb CO_2 from the atmosphere may produce it in the future, adding to the greenhouse effect. *BBC News,* September 21, 2005, http://news.bbc.co.uk/2/hi/science/nature/4269066.stm. Also see, "Heat Waves May Compound Global Warming," *NPR's Morning Edition,* September 22, 2005, http://www.npr.org/templates/story/story.php?storyId=4858811 (audio)

"Global Warming 'Past the Point of No Return'." A record loss of sea ice in the Arctic this summer has convinced scientists that the northern hemisphere may have crossed a critical threshold beyond which the climate may never recover. Scientists fear that the Arctic has now entered an irreversible phase of warming which will accelerate the loss of the polar sea ice that has helped to keep the climate stable for thousands of years. Satellites monitoring the Arctic have found that the extent of the sea ice this August has reached its lowest monthly point on record, dipping an unprecedented 18.2 percent below the long-term average. *The Independent* (UK), September 16, 2005, http://www.commondreams.org/headlines05/0916-09.htm
Also see, "In a Melting Trend, Less Arctic Ice to Go Around," *New York Times,* September 29, 2005, http://www.nytimes.com/2005/09/29/science/29ice.html

Policy

"California approves world's toughest vehicle emissions rules." The California Air Resources Board (CARB) announced that the state's greenhouse gas (GHG) regulations for vehicles were unanimously approved by the California Office of Administrative Law on September 16, and filed with the Secretary of the State. Beginning with Model Year 2009, the new rules set limits for the total GHG emissions that new vehicles can emit per mile. The limits tighten each year after that, and by 2016, GHG emissions from lighter vehicles will be cut by one-third, while GHG emissions from heavier vehicles will be cut by about one-quarter. *USA Today*, September 25, 2005, http://www.usatoday.com/news/nation/2004-09-25-calif-rule_x.htm

"Court dismisses global-warming case." A U.S. federal district court dismissed a lawsuit filed by eight states that claimed emissions released by the coal-fired power plants of a handful of U.S. utilities contribute to global warming and create a "public nuisance." Judge Loretta Preska of the U.S. District Court for the Southern District of New York said in her opinion that the case presented "political questions" that should be dealt with outside the judicial branch of government. *CBS Marketwatch,* September 15, 2005, http://www.marketwatch.com/news/story.asp?dist=&param=archive&siteid=mktw&guid=%7BAAE8BEEE%2D9920%2D4F6C%2D88F9%2DAAFEC0DB8B95%7D&garden=&minisite (registration required)

"Northeast Greenhouse Gas Control Plan Far From Sealed." The Northeast Regional Greenhouse Gas Initiative (RGGI) is on the verge of issuing a preliminary proposal, but sources familiar with the nation's first broad-based, mandatory CO_2-reduction cap caution that an agreement is far from sealed as a slew of questions remain on a number of critical details. The plan – which would cut CO_2 emissions in the nine participating states by 10 percent in 2020 – will include an initial proposed regional CO_2 cap of about 150 million tons along with suggested caps for individual states, according to a memo outlining the plan. However, the plan will not explicitly explain how those numbers were derived – a concern for some observers because it could limit the plan's value for other regional efforts, such as the one being undertaken by California, Oregon and Washington. Some observers are also disappointed that the proposal would allow offsets from activities other than emissions reductions, such as carbon sequestration, to account for up to 50 percent of the costs. In addition, there is concern that the plan does not require states to specifically correct for "leakage," or the amount of CO_2 created through purchase of electricity generated in states not subject to the cap. *EnergyWashington*, August 31, 2005, http://www6.lexisnexis.com/publisher/EndUser?Action=UserDisplayFullDocument&orgId=1925&topicId=100002042&docId=l:306481874&start=3

"Global Treaties Ineffective Against Warming, Experts Say." According to a study by three California scientists, wide-ranging international treaties like the Kyoto Protocol may not be the best ways to battle global warming. Arguing that global treaties are only as effective as their least willing signatories, the team says that climate change is better fought from the bottom up. Countries, regional partnerships, U.S. states, and even individual private firms, the scientists believe, can establish various controls to limit climate-changing activities. *National Geographic News*, September 15, 2005, http://news.nationalgeographic.com/news/2005/09/0915_050915_warming.html. For the original article, see "A Madisonian Approach to Climate Policy," *Science,* September 16, 2005, http://www.sciencemag.org/content/vol309/issue5742/index.shtml (subscription required)

"Blair falls into line with Bush view on global warming." Sharing a platform with the U.S. Secretary of State, Condoleezza Rice, in New York this month, Tony Blair changed his views on combating global warming. Mr. Blair told this month's meeting at the Clinton Global Initiative that he was putting his faith in "developing science and technology." His remarks reportedly outraged environmentalists. *The Independent* (UK), September 25, 2005, http://www.climateark.org/articles/reader.asp?linkid=46654

"Japan Government may buy Heavy CO_2 Credit Volume from 2006." Japan's government said it might begin to buy carbon dioxide credits on fears that voluntary efforts by industries may not achieve the country's target to cut greenhouse gases. Japan's Ministry of Economy, Trade and Industry (METI) estimates the country will need 20 million tonnes worth of emission rights a year to meet its commitments by 2008-2012 under the UN Kyoto Protocol on climate change. "It is necessary to set up systems to acquire credits by the government from the fiscal year (starting April) 2006 so that our country can secure necessary credit volumes for sure and with cost efficiency," an METI document said. *Reuters,* September 22, 2005, http://www.planetark.com/dailynewsstory.cfm/newsid/32614/story.htm

"Aircraft set to jet into EU emissions trading." According to this article, the airline industry will join the European Union's emissions trading system under a proposal under consideration by the EU executive Commission. The European Commission has studied three ways to include the aviation sector in its efforts to cut greenhouse gases, either through a tax, a ticket charge, or inclusion in the emissions trading scheme. Environment Commissioner Stavros Dimas has repeatedly stated his preference for the last option, and his Commission colleagues are expected to endorse that position, officials said. *Reuters*, September 23, 2005, http://uk.news.yahoo.com/23092005/325/aircraft-set-jet-eu-emissions-trading.html

"BA launches scheme to offset CO_2 emissions." British Airways has launched a government-backed scheme that allows its customers to offset the carbon dioxide emissions from their flight by making a contribution to an environmental trust. Climate Care will use the contributions to invest in sustainable energy projects that tackle global warming, the Department for the Environment, Food and Rural Affairs said in a statement. *Forbes*, September 12, 2005, http://www.forbes.com/home/feeds/afx/2005/09/12/afx2218058.html

"Carbonfund & Ceres Launch Carbon Offset Program." Carbonfund, a nonprofit organization dedicated to reducing the threat of climate change, and Ceres, a coalition of investors, environmental and public interest organizations, have launched a joint carbon offset program. Under the program, participants in the Ceres network will be encouraged to offset their personal and corporate carbon footprint by making a donation to Carbonfund. Carbonfund then supports a variety of carbon reducing projects, including renewable energy, energy efficiency and sequestration that remove the equivalent carbon dioxide from the atmosphere. *CSR Wire*, September 21, 2005, http://www.csrwire.com/article.cgi/4450.html

Terrestrial

"Forests 'may absorb less CO_2 than thought'." Due to rising carbon dioxide levels, forests may not be able to slow down global warming as effectively as previously thought, according to a study by a team of UK based scientists from the Lancaster Environment Centre. Says Dr. James Heath of Lancaster University, "This is the first study using a wide range of tree species to show that, while trees may take up more CO_2 as CO_2 levels in the atmosphere rise, less may end up being stored in the soil." It was assumed that under higher CO_2 conditions the trees would grow faster and release more carbon into the soil via the roots and that therefore, more carbon would be retained in the soil. The experiment showed that this may not be the case, because at increased CO_2 concentrations more of the extra carbon transferred to the soil by the tree roots was simply released back into the atmosphere through the respiration of soil micro-organisms. *Press Association*, September 9, 2005, http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=16392. For the original article, see "Rising Atmospheric CO_2 Reduces Sequestration of Root-Derived Soil Carbon," *Science,* September 9, 2005, http://www.sciencemag.org/content/vol309/issue5741/index.shtml (subscription required)

"Vicious Circle Of CO_2 Emissions Is Speeding Up Climate Change." A new study finds that, since 1978, the soil of Britain has released an extra 13 million tons of carbon dioxide a year, which is more than the 12.7 million tons a year saved by cleaning up industrial pollution during that period. Scientists previously thought the soil could be a major sink for about a quarter of the industrial CO_2 emissions, but the latest findings suggest that in a warmer world the soil will actually become a new source of the greenhouse gas. "Our findings suggest that the soil part of the equation is scarier than we thought. It means we've got 25 percent more carbon to think about," said Guy Kirk of the National Soil Resources Institute at Cranfield University, who led the study. *The Independent* (London), September 8, 2005, http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=16394
Also see, "Loss of soil carbon will speed global warming," *Guardian* (UK), September 8, 2005, http://www.guardian.co.uk/uk_news/story/0,3604,1565041,00.html

"CO_2 not certain to counter climate change." The world cannot count on the "fertilizing" effects of carbon dioxide to counteract the adverse impact of global warming on crop yields, according to a paper presented at the British Association Science Festival. Scientists have simulated in open fields the effects of the atmospheric changes expected to take place over the next 50 years - and discovered the benefits predicted from previous greenhouse experiments do not materialize. Steve Long, a crop scientist at the University of Illinois, told the festival in Dublin: "Current projections of global food supply under climatic and atmospheric change are likely to be very optimistic." *Financial Times*, September 6, 2005, http://www.climateark.org/articles/reader.asp?linkid=45888

"Tahoe National Forest Hosts Groundbreaking Climate Change Research." Article highlights research to find accurate and cost-effective ways to measure and monitor forest carbon storage (carbon sequestration). Currently underway on public lands in the North Yuba River area, the research project is a collaboration of eight private and public organizations, including the U.S. Department of Energy who is funding 80 percent of the research. The project began in July 2005 and data collection should be finished by December 2005. According to the article, forests around the globe may be able to provide carbon credits to nations and industries seeking to offset carbon dioxide emissions through forest conservation. *YubaNet.com* , September 14, 2005, http://www.yubanet.com/artman/publish/article_25085.shtml

"Rhizotron sets MTU apart." The U.S. Forest Service is building a 75-foot underground research tunnel at Michigan Tech University. Known as the Rhizotron, the tunnel will be used for research on roots and carbon sequestration. The tunnel will feature 24 removable windows so that testing may be done at the root level. The main goal of the tunnel and its overall purpose is to research more about carbon sequestration and how to implement it in such a way as to slow the process of global warming. The objective is to discover which plant species favor sequestration. *Michigan Tech University Online Lode*, September 7, 2005, http://www.mtulode.com/index.php?issuedate=2005-09-07&section=12&artid=4519

Ocean

"Climate change will affect carbon sequestration in oceans, model shows." An Earth System model developed by researchers at the University of Illinois at Urbana-Champaign indicates that the best location to store carbon dioxide in the deep ocean will change with climate change. "Through a number of physical and chemical interactive mechanisms, the ocean circulation could change and affect the retention time of carbon dioxide injected into the deep ocean, thereby indirectly altering oceanic carbon storage and atmospheric carbon dioxide concentration," said Atul Jain, a professor of atmospheric sciences. "Where the carbon dioxide is injected turns out to be a very important issue." *EurekAlert*, September 7, 2005, http://www.eurekalert.org/pub_releases/2005-09/uoia-ccw090705.php

Trading

Carbon Market Update, September 30, 2005

CCX-CFI 2005 ($/tCO$_2$)	**$2.44**
EU ETS-EUA 2005 ($/tCO$_2$)	**$27.51**

"Brazil opens carbon credit market." The Brazilian Development Ministry has launched the region's first carbon credit market in cooperation with the Brazilian Stock Exchange in Rio de Janeiro. This move paves the way for industry in developed countries to offset high levels of greenhouse gas emissions by purchasing carbon credits in Brazil. Brazilian Ministry of Science and Technology Chief Coordinator of Research in Global Change, José Miguel, expects some 30 projects to be approved. Meanwhile, the World Bank reports that carbon sequestration projects submitted by Asian countries reached 51 percent of total projects in 2003, up from 21 percent in 2002. *ISN Security Watch*, September 15, 2005, http://www.ieta.org/ieta/www/pages/index.php?IdSitePage=954

Trading, Cont'd

"Evolution Markets Brokers First Option Trade for European Emissions Market." Evolution Markets announced it arranged the first ever brokered option trade under the European Union's Emissions Trading Scheme (EU ETS). The option for 160,000 European Union Allowances (EUAs) was sold by EDF Trading, the wholesale trading arm of French power company Electricite de France, to Statkraft's Amsterdam-based carbon trading desk. Option trading structures provide market participants tools to manage risk associated with the movement in the price of carbon allowances. An option buyer has the ability but not the obligation to buy or sell emissions allowances at a set price and will often exercise this right should the price move in a particular direction. As such, options provide protection against price risk in the carbon market. *Evolution Markets Press Release,* September 27, 2005, http://www.evomarkets.com/scripts/pr_full.php?pr=49

"Indian Firms Seek $5 Billion From Carbon Credit Sales in 7 Years." Industries in India, exempt from emissions cuts imposed on industry in Europe and elsewhere, plan to reduce their greenhouse gas output and sell the resulting credits for up to $5 billion over the next seven years. Analysts say countries such as India and Brazil are already leading suppliers of certified carbon emission reduction credits (CERs). "Indian companies currently supply more than 30 percent of the (traded) CERs. They could improve that share," said Ajay Mathur, president of carbon credit trader Senergy Global Pvt. Ltd. *Brisbane's News 1*, September 15, 2005, http://www.leadingthecharge.com/stories/news-0072754.html

"Swiss Re Joins Chicago Climate Exchange." Swiss Re, the world's largest life and health reinsurer, has announced it will join the Chicago Climate Exchange (CCX). CCX is North America's only multisector marketplace for reducing and trading greenhouse gas emissions. "Insurance companies have a critical role to play in developing sound strategies to address the challenge of climate change. We commend Swiss Re for again taking a proactive stance and joining CCX," said Dr. Richard Sandor, chairman and CEO of CCX. *GreenBiz*, September 20,2005, http://www.greenbiz.com/news/news_third.cfm?NewsID=28794

Events

October 6, 2005, **Forum on State Clean Air and Climate Change Initiatives,** Delta King Hotel, Sacramento, California. The forum on State Clean Air and Climate Change Initiatives and the Role of Clean Energy Technologies will assess emerging climate change and air quality regulations in California, the Northeast and other states/regions and their linkages with energy procurement in the Pacific Northwest. For more information, http://www.bcse.org/ or contact BCSE at 202.785.0507 or rsvp@bcse.org

October 13, 2005, **NREL Brownbag on Climate Forecasts for the Energy Industry**, Washington, DC. David Pierce of the Scripps Institution of Oceanography presents a lunchtime seminar on "Climate Forecasts for the Energy Industry: Case Examples and Lessons Learned." The event will be held from 12 noon to 1:00 pm at the National Renewable Energy Laboratory's Washington, DC, office at 901 D Street, SW, Suite 930. For more information, visit http://www.nrel.gov/analysis/seminar/

October 31 – November 1, 2005, **Carbon Finance 2005: Risk and opportunities in emissions markets**, London, UK. Attendees will gain an invaluable update on all the major global developments shaping the fast-moving markets in carbon credits and allowances, with insights and analysis from toplevel specialists from a broad range of organizations, including talks on what to expect at December's COP11/MOP1 meeting and Phase II of the EU ETS. For full program details and to register, see http://www.environmental-finance.com/envfin/CF2005.pdf

November 1, 2005, **Climate & Oceans & Policy Conference**, Washington, DC. The Royal Norwegian Embassy is organizing the Third Trans-Atlantic Cooperative Research Conference. The principal objective of the Conference is to provide a collaborative network arena for front-line, solution-oriented research relating to the international climate regime. The event takes place from 9:00am-6:00pm at the Carnegie Institution, 1530 P Street, NW, Washington, DC. For more information, visit http://www.norway.org/restech/future/4thannual.htm

November 9 – 10, 2005, **Coal-Seq IV Forum**, Denver, Colorado. The annual Coal-Seq Forums bring together experts from around the world to share information about their views and activities on the topic of carbon sequestration in coalseams, as well as enhanced coalbed methane recovery. They are excellent opportunities to stay abreast of the latest technology and global activities, as well as meet the leading experts in the field. Registration fees for non-members of the Coal-Seq II Consortium are US$195. For more information contact Susan Pershall at 713-780-0815 or spershall@adv-res-hou.com, or go to http://www.coal-seq.com

November 13-17, 2005, **Greenhouse 2005: Action on Climate Control,** Melbourne, Australia. There is a clear need for industry, scientists, and government at all levels to work closely together to tackle this significant environmental issue. Demand is strong for the latest information on the science, the likely impacts of climate change, adaptation strategies, and approaches to reducing atmospheric greenhouse gas concentrations. The Conference will cover these themes as well as international issues, policy development, communication and education. For more information: http://www.greenhouse2005.com Contact: Paul Holper - paul.holper@csiro.au

CALL FOR POSTER PRESENTATIONS: November 15-17, 2005, **Applied Technology Workshop (ATW) on "CO_2 Sequestration,"** Hilton Galveston Island Resort, Galveston, TX. Hosted by the SPE, the workshop will include plenary sessions on perspectives of private and public organizations and consortia and technical sessions focusing on planned and operating projects. Breakout sessions will address outstanding subsurface, facilities / operations, stakeholder and economic issues. The organizing committee will be issuing a call for poster presentations. Co-Chairs: Scott Imbus (Chevron) and Lynn Orr (Global Climate and Energy Project, Stanford University). Further information: http://www.spe.org

November 21-22, 2005, **5th Annual Emissions Trading & The Carbon Markets Conference,** London, UK. As trading in EU allowances slowly matures, it is critical for market participants to effectively analyze the latest developments in light of the whole array of carbon management strategies available to emitters. For additional information please visit http://www.euromoneyenergy.com/default.asp?Page=13&eventid=ECK114

November 28 – December 9, 2005, **United Nations Climate Change Conference (COP 11 and COP/MOP 1)**, Montreal, Canada. Canada will host the first meeting of the Parties to the Kyoto Protocol in Montréal in conjunction with the eleventh session of the Conference of the Parties to the Climate Change Convention. For more details, please see http://unfccc.int/meetings/cop_11/items/3394.php

November 30, 2005, **European and American Business Perspectives on Emissions Trading and Climate Policy,** The Roosevelt Hotel, New York, NY. The event will inform EU and U.S. companies, financial firms, and climate negotiators on recent developments in emissions trading and climate policy on both sides of the Atlantic. For more information, please see http://lists.iisd.ca:81/read/attachment/26909/1/MistralInvite.pdf

Events, Cont'd

December 5-9, 2005, **American Geophysical Union's (AGU) 2005 Fall Meeting**, San Francisco, CA. Session B07: Approaches to Stabilizing Atmospheric CO_2 and Climate, will provide a forum for discussion of promising CO_2 and climate change mitigation strategies. For meeting details see http://www.agu.org/meetings/fm05

December 6-9, 2005, **Carbon Management Workshop and 11th Annual CO_2 Flooding Conference**, Midland, Texas. Planned for December 6 and 7, the EOR Carbon Management Workshop will offer an in-depth look at CO_2 geologic storage, its trends, developments and opportunities. Also featured is a field tour on December 7 of Kinder Morgan Production Company's Yates Field where the company conducts a gravity-dominated CO_2 flood. The CO_2 flooding conference, set for December 8 and 9, will focus on the use of carbon dioxide for enhanced oil recovery. The conference features theme sessions that examine current industry best practices in operations and reservoir management. For additional information visit http://www.spe-pb.org/co2_conference/index.asp

January 22-25, 2006, **9th Annual EUEC 2006 Conference on Air Quality, Climate Change & Renewable Energy**, Westin La Paloma Resort, Tucson, AZ. Visit the conference website for more information http://www.euec.com/default.html

February 20-21, 2006, **The 2nd Australia–New Zealand Climate Change and Business Conference**, Adelaide, Australia. A conference to explore business opportunities and risks associated with climate change, including emerging technologies and innovative approaches to reducing emissions and adapting to climate change. Please send all enquiries to the Conference Organizer, Jo Hume, at jo.hume@oxbowcurve.com. Visit the conference website to find out more http://www.climateandbusiness.com

May 9-12, 2006, **Engineering Institute of Canada Climate Change Technology Conference**, Ottawa Congress Centre, Ontario, Canada. The Engineering Institute of Canada (EIC) and its member societies are taking the lead to stimulate awareness and action by the Canadian Engineering Community for solutions that mitigate or adapt to climate change. See http://www.CCC2006.ca for details.

June 19-22, 2006, **GHGT-8**, Trondheim, Norway. The aim of this conference is to provide a forum for the discussion of the latest advances in the field of greenhouse gas control technologies. Details at http://www.ghgt-8.no

Recent Publications

"Spending on environment yields big returns-report." A U.N.-backed report on the social returns of investing in the environment suggests that forests may be more valuable when left standing rather than being cleared for crops because trees can absorb the heat-trapping gases widely blamed for global warming. "The carbon storage or 'sequestration' potential of forests ranges between $360 and $2,200 per hectare which makes them worth far more than if they are converted to grazing or cropland," UNEP said. And the study said that it becomes far more cost effective to conserve forests than to clear them once carbon prices exceed $30 a tonne. *Reuters*, September 14, 2005, http://www.alertnet.org/thenews/newsdesk/L14643761.htm

"Integrated climate-change strategies of industrialized countries." This paper provides an overview of the evolving climate-change strategies put in place by industrialized countries to combat climate change and to comply with their quantitative commitments under the Kyoto Protocol. It presents the emerging new and integrated method of climate-policy formulation and implementation based on a portfolio approach, where a mix of policies and measures are selected to help achieve the required emissions reduction. *Energy*, Volume 30, Issue 14, Pages 2523-2758 (November 2005), http://www.sciencedirect.com/science/journal/03605442 (subscription required)

"Carbon Capture and Storage – Market Opportunities 2005." This report, produced for Scottish Enterprise and the DTI, says Scottish businesses in particular can capitalize on the opportunities presented by the growing need to tackle rising CO_2 emissions from the combustion of fossil fuels. It was commissioned to assess the market opportunities arising from carbon capture and storage in depleted oil and gas fields in the North Sea. *Scottish Enterprise*, September 2005, http://www.scottish-enterprise.com/sedotcom_home/sig/sig-energy/energy-oilandgas/energy-oilandgas-help/energy-oilandgas-research.htm#carbon_capture

Legislative Activity

U.S. Senate Energy Committee Holds Climate Hearing. On September 20, the Senate Committee on Energy and Natural Resources held a full committee hearing titled "Climate Change Science and Economics." Chairman Pete Domenici (R-NM) said, "I am pleased that the committee is continuing its discussion on climate change. It is clear that something is happening with the Earth's climate. I am aware that many in the scientific community are warning us that something needs to be done. I am also aware that there are equally qualified members of the scientific community who do not share those views. Nevertheless, I believe that it is prudent to heed the warnings we are hearing and begin to find ways of alleviating the human contribution to climate change. With this hearing, we will continue the search for meaningful, economically feasible answers that will produce real reductions in greenhouse gas emissions." To read the witness testimonies, visit the U.S. Senate Energy Committee website at http://energy.senate.gov/public/index.cfm?FuseAction=Hearings.Hearing&Hearing_ID=1496

This newsletter is produced by the National Energy Technology Laboratory and presents summaries of significant recent events related to carbon sequestration. If you'd like to join the e-mail distribution list, email majordomo@list-manager.netl.doe.gov with "subscribe sequestration" in the body of the message. We encourage you to pass this along to interested persons. Contacts: Sean Plasynski, sean.plasynski@netl.doe.gov or David Hyman, david.hyman@netl.doe.gov.