



THE CARBON SEQUESTRATION NEWSLETTER

TABLE OF CONTENTS

November 2002

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

Sequestration in the News

NETL's Second National Conference on Carbon Sequestration, *Developing and Validating the Technology Base to Reduce Carbon Intensity* will be held May 5-8, 2003 in Alexandria, VA. The First National Conference was held May 2001 and was attended by over 400 national and international experts from government, academia, and industry. You are invited to submit a paper proposal that builds on what was presented at the 2001 Conference, or breaks new ground. The Steering Committee and National Energy Technology Laboratory staff will be looking for innovative ideas, as well as progress reports on development of carbon sequestration strategies to meet the national goal of an 18% reduction in carbon intensity. Guidelines for abstracts: Submit a 100 word abstract via e-mail to carbonsq@exchangemonitor.com, by Feb. 7, 2003.

Progress on a Major New EOR Project Using Anthropogenic CO₂. Anadarko Petroleum Corp. agreed to buy Howell Corp., which has Salt Creek field, one of the largest remaining EOR opportunities in the Lower 48 states. Anadarko will also purchase exclusive rights to market and transport CO₂ captured from the LaBarge oilfield into Wyoming's Powder River Basin. Anadarko also announced plans to build a \$27 million, 125-mile CO₂ pipeline, with nominal capacity of about 250 million cubic feet per day in 2003. "[Anadarko's Purchase of Howell is Part of a larger Domestic EOR Initiative,](#)" *Petroleum Finance Week*, October 7, 2002.

Public-Private Partnerships in Voluntary Carbon Trading. An article on the Chicago Climate Exchange describes goals of the companies and entities involved in the project, scheduled to open trading in 2003. "[A New Approach to Global Warming,](#)" *The Economist*, October 17 2002.

GHGT-6 in Kyoto. 500 participants from 36 countries attended The Sixth International Conference on Greenhouse Gas Control Technologies in Kyoto, Japan, the first week of October. The 334 presentations included 90 posters, with the U.S., Canada and Japan representing the greatest participation. 100 more papers were presented than at GHGT-5, in 2000 in Australia, with geologic storage emerging as a favored topic. In the twelve years since the conference started, research and development has shown significant progress. Acid gas injection projects in Canada, progress reports and updates from the Sleipner Field, planned field tests of geologic storage in Japan, and a BP project re-injecting captured CO₂ into natural gas reservoirs in Algeria set a precedent for continuing field research. Topics also included novel capture methods such as molten carbonate reactions, "anti-sublimation," pre-combustion capture for Fischer-Tropsch fuel processing, modeling of leakage rates, reservoir characteristics, and economics. Terrestrial and ocean sequestration, public outreach, and the role of industry were also discussed. The conference was organized by the Research Institute of Innovative Technology for the Earth (RITE), the IEA Greenhouse Gas R&D Programme, and the Japan Society of Energy and Resources (JSER). Papers will be published by Elsevier Science in March of 2003. GHGT-7 will be held in Vancouver, Canada, in September of 2004. Papers for GHGT-6 are available [online](#).

PG&E Joins California Climate Action Registry. PG&E Corporation has become a Charter Member of the California Climate Action Registry, a private, nonprofit voluntary registry for GHG emissions. The Registry's other 23 Charter Members include Natural Resources Defense Council and the State of California Environmental Protection Agency. "[PG&E Corporation Joins California Climate Action Registry,](#)" *PRNewswire*, October 24, 2002

Sequestration in the News, Cont'd

Rolls Royce Chairman Highlights Carbon Sequestration in Speech. Euan Baird, chairman of Rolls Royce, gave the 5th Dewhurst Lecture at the [17th World Petroleum Conference](#) in Rio de Janeiro,. From the speech: "...we need to reposition ourselves as a trusted, long-term partner. This means investing heavily in new technology to address the two main concerns our customers have about energy solutions involving oil and gas. First, security of supply at an affordable price... Second, the issue of environmental acceptability... Probably the most straightforward proposal is to sequester carbon dioxide in depleted oil and gas reservoirs." September 2002.

NRDC Protests Natural CO₂ Drilling. The Natural Resources Defense Council requested that the Bureau of Land Management review one of its field office's decisions to allow a Texas company to drill CO₂ wells (for use in EOR in Texas) in the Canyons of the Ancients Monument in Colorado on grounds that the field office should consider the UNFCCC as well as U.S. law. "Crazy About Carbon," [Wall Street Journal](#), October 17 2002, (subscription required).

Legal Gateway to Climate Change Issues. Pace University School of Law has relaunched its [Global Warming Central](#), a source for information on the Global Warming Debate since 1997, providing information on global warming and climate change from a legal perspective.

Capture Technology

Integrated Capture and Fertilizer. Researchers from NREL and ORNL are working with Eprida Scientific Carbon to improve an integrated bioenergy and sequestration system, whereby 20% of CO₂ emissions can be sequestered, forming a nitrogen fertilizer and hydrogen. NO_x and SO_x are captured as well. The process creates a slow release fertilizer. "[Is Profitable Sequestration Of Power Plant Emissions Right Around The Corner?](#)" [Internet Wire](#), October 24 2002.

Climate Technology Awards. The winner of the 2002 [CTI Climate Technology Leadership Award](#) (individuals) is René Núñez-Suárez, for developing a low temperature combustion process (which results in a slower rate of material combustion, and therefore less GHGs) for fossil and non-fossil fuels. The winner of the 2002 CTI World Climate Technology Award (organizations) is: The Centre for Power Efficiency and Environment Protection (CenPEEP), for supporting the adoption of more-efficient coal power plants in India.

Terrestrial

Land Use and Climate: a Close Link. A NASA study suggests that changes land use impacts climate are at least as important as the effects of GHGs, when one considers that farm irrigation, urban development, and clearing forests redistribute heat within the atmosphere by adding moisture to the ecological system. "[Land-use changes may rival greenhouse gases as cause of climate change](#)," NASA, October 1, 2002. The paper was published in the *Philosophical Transactions of the Royal Society of London*.

Quantifying Terrestrial Storage. Preliminary research conducted by CarboEurope, has found that clearing soil for tree plantations releases as much carbon to the atmosphere as would be absorbed in the first ten years of growth. "Environment – State of Research on Carbon Sinks," [Europe Energy](#), October 29, 2002.

Forest Offset Project. Kansai Electric Power Co. of Japan will support a tree plantation in Australia estimated to absorb 860,000 tons of CO₂ over the 20 year term of the project. Japan does not yet have a GHG trading market, but is increasingly active in international trading of CO₂. "[Kepco to Plant Trees in Australia](#)," October 18, 2002.

Ocean

Dust Causes Ocean Blooms. In the spring of 2001, two Carbon Explorer floats recorded the rapid growth of phytoplankton in the upper layers of the North Pacific Ocean after a passing storm deposited iron-rich dust from the Gobi Desert. This observation supports one of the key assumptions of the iron hypothesis: wind-blown dust stimulates plankton growth in otherwise unproductive waters. The U.S. Department of Energy's Office of Science, Ocean Carbon Sequestration Program supported this research. "[Robotic observations of carbon biomass enhancement after the April 2001 Asian dust event in the subarctic North Pacific](#)," [Science](#), October 25, 2002.

Fertilizing Phytoplankton. An article in *Scientific American* on ocean carbon sequestration highlights the science of iron fertilization. "[The Little Plankton That Could...Maybe](#)," [Scientific American](#), October 7 2002.

Carbon Trades More than Triple in 2002. Worldwide trading of credits in CO₂ emissions linked to global warming is poised to more than triple this year to an estimated 67 million tons as companies prepare for the Kyoto Protocol. "[Global Carbon Credit Market Seen Tripling This Year](#)," October 21, 2002, Reuters.

Database of Country and Regional Trading Strategies. A new report from Point Carbon focuses on the increasing number of regional, national and international systems for trading of greenhouse gas emission allowances and emission reduction credits. The analysis builds on a database developed by Point Carbon for the International Emissions Trading Association (IETA), that covers all known trading schemes and programs, which is also available for viewing. "[Emerging Systems for Carbon Trading](#)," [Point Carbon](#), October 30 2002.

Sequestration in the News, Cont'd

Politics

Climate Leaders News. Two items of interest emerged from the Bush Administration's Climate Leaders Program. First, thirteen companies joined the program, bringing the number of participants to 43. New members of the program include: Advanced Micro Devices; Ball.; Baxter International ; Casella Waste Systems; Eastman Kodak; First Environment; Hasbro.; IBM; Pfizer.; Shaklee.; STMicroelectronics; Target; and We Energies. Second, some of the veteran Climate Leaders revised their GHG reduction targets. Bethlehem Steel Corp. and Holcim Inc will cut emissions by 12 percent per ton of product from 2000 to 2010, the National Renewable Energy Laboratory will cut emissions by 10 percent per square foot from 2000 to 2005, and S.C. Johnson & Son Inc. will cut emissions by 23 percent per pound of product from 2000 to 2005. "13 more firms join admin. initiative," October 4, 2002, *Greenwire*.

Industry Joining Coalitions Supporting Proactive CO₂ Action. Two U.S. groups of energy companies have formed which support multi-pollutant legislation for carbon, SO₂, NOx, and mercury. One is the Clean Energy Group, which includes Conectiv Inc, Consolidated Edison, Exelon, Keyspan, Northeast Utilities, PG&E, PSEG, and Sempra Energy. The other is the [Clean Power Group](#), which includes Calpine, El Paso Energy, NiSource, and Trigen Energy. Entergy was the first American utility to join a separate international group called the Partnership for Climate Action, followed by Dupont. "[US utilities tackle greenhouse gases](#)," October, 2002, *Platts Energy Business & Technology*.

Alberta and EOR. Alberta is reviewing its economic fiscal and regulatory framework for enhanced oil recovery projects. The province currently allows companies to deduct the cost of hydrocarbons used in EOR projects, but not CO₂. The province's climate change plan calls for three EOR or ECBM (enhanced coal bed methane) demonstration projects to be in place by end of 2003. "Alberta touts novel CO₂ plan: Greenhouse gas could help boost oil output," October 1, 2002, *Calgary Herald*.

Governors Encourage EOR. A work group organized by the Interstate Oil and Gas Compact Commission and the US Department of Energy plans to study potential uses for CO₂ sequestration within the oil industry. The group represents the governors of 30 member energy-producing states with high potential for sequestration: Alaska, California, Colorado, Illinois, Kansas, Nebraska, New Mexico, North Dakota, Ohio, Oklahoma, Texas, Utah, West Virginia, and Wyoming. "US oil industry seen playing key role in greenhouse gas emissions cuts," September 30, 2002, *Oil & Gas Journal*.

The United States and New Zealand plan to enhance cooperation on climate change issues such as climate change science and monitoring in the Pacific; cooperation in the development of emission registries; GHG accounting in forestry and agriculture; and development of carbon reduction technologies. "[U.S., New Zealand Work to Improve Bilateral Climate Change Cooperation](#)," October 24, 2002, U.S. Department of State.

Canadian Climate Action. Canada announced a \$15 million initiative under Canada's Action Plan 2000 to combat climate change, called Pilot Emission Removals, Reductions and Learnings (PERRL). PERRL is now accepting submissions for GHG removal/reduction in landfill gas capture and combustion, and CO₂ capture and geological storage. "[Government of Canada Reveals Perrls in Shell of Action Plan 2000](#)," October 17, 2002, Environment Canada.

Events and Announcements

NETL Academic Solicitation. In support of advanced coal research to U.S. colleges and universities, a competitive Program Solicitation No. [DE-PS26-03NT41634](#) is being offered to qualified recipients. The following focus areas are relevant to sequestration: 6: Simulation of CO₂-Brine-Mineral Interactions, 7: CO₂ Separation From Coal Gasification Process, and 2 Carbon Sequestration. The closing date for submission of proposals will be December 5, 2002, NETL.

DOE Small Business Solicitation. The Department of Energy [Small Business Innovation Research](#) and Small Business Technology Transfer Program will select 200 Phase I grant applications for up to \$100,000 over a period of six to nine months. Topics of particular interest to readers: 8: Biological Carbon Sequestration Research and Technology, and 7: Carbon Cycle Measurements of the Atmosphere and the Biosphere. For more information, email sbir-sttr@science.doe.gov.

Office of Science Solicitation. Applications for work in the following program areas are solicited: Basic Energy Sciences, Biological and Environmental Research (including climate change and terrestrial and ocean sequestration research), and Energy Research Analyses. Approximately \$400 million will be available for grants in FY 2003. Applications may be submitted until September 30, 2003. *Continuation of Solicitation for the Office of Science Financial Assistance Program--Notice 03-01*, October 17, 2002, Federal Register.

Future Energy Systems and Technology for CO₂ Abatement. Organized by The Technological Institute, this symposium will cover the potential impact of chemistry, catalysis, and process engineering in CO₂ abatement from industry, transport, and other areas. CO₂ capture and sequestration will also be covered. The [symposium](#) will be held in Antwerpen, Belgium, from November 17-20, 2002.

Events and Announcements, Cont'd

Voluntary GHG Reporting Rules. The Departments of Energy and Agriculture, and the Environmental Protection Agency announce the first series of workshops to enable interested persons to help improve the guidelines for the Department of Energy's Voluntary Greenhouse Gas Reporting Program and related programs. Please note that you must [register](#) 3 weeks in advance.

Dates and locations for the workshops organized by DOE:

Washington, DC	November 18-19, 2002
Chicago, IL	December 5-6, 2002
San Francisco, CA	December 9-10, 2002
Houston, TX	December 12-13, 2002

Dates and locations for the workshops organized by USDA:

Agriculture Accounting Rules and Guidelines,	January 14-15, 2003
Forest Accounting Rules and Guidelines,	January 23, 2003

USDA Symposium on Natural Resource Management to Offset Greenhouse Gas Emissions will be held November 19-21, 2002, in Raleigh, NC. [Researchers will present](#) management options for increased carbon storage, innovative technologies and methodologies for monitoring and measuring terrestrial carbon stocks, and economic projections.

EPA State and Local Climate Change Conference. EPA is holding the [5th State and Local Climate Change Partners' Conference](#) November 20-22 in Annapolis, Maryland. Meeting topics will include greenhouse gas registries, science and policy updates, and renewable energy and energy efficiency opportunities. The conference will feature new tools for state greenhouse gas inventories and co-benefits analysis. Regional breakout sessions are planned. For general conference information, contact Andrea Denny at denny.andrea@epa.gov.

United States Climate Change Science Program will hold a workshop 3-5 December 2002 in Washington, DC, to review a new draft Strategic Plan for the US Global Change Research Program and Climate Change Research Initiative (CCRI). "[U.S. Climate Change Science Program: Planning Workshop for Scientists & Stakeholders.](#)"

The American Geophysical Union Fall Meeting will be held December 6-10 in San Francisco. A special session entitled "[Carbon Sinks and Carbon Management: Scientific Perspectives on Potential Benefits and Consequences](#)" will be convened as part of the conference. The conference code for this session is U08.

Electric Utilities Environmental Conference. The [6th Annual Conference on Air Quality & Global Climate Change](#) will be held January 27-30, 2003, in Tucson, Arizona. The conference will cover policy, trading, voluntary programs, and science and technology options, including carbon sequestration. DOE is one of the conference sponsors.

NETL at the February AAAS Meetings. Carbon Sequestration is on the agenda at [The American Association for the Advancement of Science](#) annual meeting, which will be held February 13-18, 2003, in Denver, Colorado. NETL has organized two symposia, "Comparative Assessment: Carbon Sequestration as a Greenhouse Gas Mitigation Strategy" and "Climate Change Mitigation Strategy: Technical Challenges for Carbon Sequestration," which will be included in the Dealing with Global Change track on Monday, February 17, 2003. Gary Rochelle, Karl Schroeder, Neeraj Gupta, Bob Warzinski, and Howard Herzog will be speaking in the Climate Change Mitigation Strategy: Technical Challenges for Carbon Sequestration AAAS Symposium. Christiana Figueres, Jim Ekmann, Klaus Lackner, Gregg Marland and Martin Hoffert will be speaking at the second symposium "Understanding and Managing the Global Carbon Cycle."

The Earth Technologies Forum, which addresses global climate change and ozone protection announces that it is accepting abstracts for papers to be delivered at its April 22-24, 2003 [conference](#) in Washington, DC. Abstracts are due November 14.

Petroleum Geologist Convention. The next annual convention of the American Association of Petroleum Geologists (AAPG) entitled "[Energy: Our Monumental Task](#)" will be in Salt Lake City, Utah, on May 11-14, 2003. A special session on "Geological Sequestration of CO₂" has been arranged.

Recent Publications

Carbon-Free Energy Options. Researchers from NYU, Lawrence Livermore National Lab, UC Irvine, University of Houston, McGill, MIT, University of Illinois, Exxon-Mobil, Columbia University, University of Arizona, the Naval Research Lab, NASA, and the National Center for Atmospheric Research collaborated on a paper published in *Science* that surveys possible future energy sources, evaluated for capability to supply massive amounts of carbon-emissions-free energy and potential for large-scale commercialization. The paper approaches energy supply from the perspective of meeting an atmospheric GHG concentration stabilization, and concludes that a broad range of intensive research and development is urgently needed. "Advanced Technology Paths to Global Climate Stability: Energy for a Greenhouse Planet," *Science*, November 1, 2002.

Recent Publications Cont'd

New Information on the NETL Webpage. Two new presentations on the Carbon Sequestration Program, and two new factsheets on CO₂ capture have been posted on the [website](#).

A media release entitled, "[The Weyburn Project: A Model for International Collaboration](#)."

The Carbon Sequestration [Kid's Hide-A-Way](#) web area.

Forestry and Agriculture Greenhouse Gas Modeling. The [Forag Forum](#) website contains the final papers, presentations, and models given at the October Forum.

Regional Climate Policy Update. The Center for Clean Air Policy has updated its state and local leadership actions on climate policy. This latest roundup of leadership actions on greenhouse gases highlights innovative and progressive actions oriented toward greenhouse gas mitigation by state and local governments with established leadership interests in this area. "[Annual Round-up of State Policy Climate Actions](#)," Center for Clean Air Policy, October 2002.

Finances and Climate Change. A CEO Briefing by the UNEP Finance Initiatives on the climate outlines potential risk to the global economy due to climate change. The report outlines potential opportunities for the sector to reduce risks or make profit, by engaging in emission trading schemes or backing clean energy. [Climate Change and the Financial Services Industry](#), UNEP, October 8, 2002.

Carbon Policy Proposals. A report published by the New Economics Foundation evaluates eight leading proposals for structuring the Second Commitment Period of the Kyoto Protocol and beyond. Issues covered include carbon intensity and price cap approaches. "[Fresh Air: Options for the Future Architecture of International Climate Change Policy](#)," NEF, October 28, 2002.

PCFplus Research, a research facility adjacent to the Prototype Carbon Fund, has made all its research reports available online, including reports on the regulatory drivers of the carbon market. [World Bank Prototype Carbon Fund](#).

Norway as a Reference Case. With relatively high costs for cutting GHG emissions, Norway can be seen as a "test case" for the feasibility of more ambitious climate agreements in the future. This argument is made in a working paper by a group of climate policy experts at CICERO and FNI. "[The feasibility of ambitious climate agreements: Norway as an early test case](#)," CICERO, October 2002.

Ocean Chemistry Reference Materials. A limited number of reference materials have been explicitly developed for ocean science. Topics include salinity, ocean CO₂, dissolved organic carbon, and dissolved gases. [Chemical Reference Materials: Setting the Standards for Ocean Science](#), National Academy of Sciences, November 2002.

Setting the Stage for Carbon Trading in Europe. "Greenhouse Gas Emissions Trading in Europe: Conditions for Environmental Credibility and Economic Efficiency," [The Centre for European Policy Studies](#), October 2002.

Legislative Activity

Comprehensive Energy Legislation. In early October, conferees met on three occasions to discuss language dealing with utility restructuring and a renewable portfolio standard, ethanol, and climate change. Congressional staff will continue to hold talks on electricity, ethanol and the tax title between now and mid-November, when Congress resumes for a lame-duck session. According to Senator Breaux, negotiators are close on ethanol and electricity. At the last news, climate provisions were not included in the [energy policy](#). "Lame-duck session may give energy conference a fighting chance," *E&E Daily*, October 14, 2002.

A new Clean Air Act Reauthorization Multi-pollutant Bill. [S.3135](#), or the Clean Air Planning Act of 2002, introduced by Senators Carper (D-Del.), Breaux (D-La.), Chafee and Baucus sets moderate emissions levels for NO_x, SO_x, Mercury and CO₂. In it, CO₂ would be capped and stabilized at 2005 levels in 2008, at roughly 2.6 billion tons. In 2012, S. 3135 would require CO₂ to be capped at 2001 levels. Flexibility measures would be incorporated. On NSR, S. 3135 would allow for a modification exemption at existing units so long as the capital project does not exceed 50 percent of the cost of a new facility or result in an emissions increase on a pound-per-megawatt-hour basis. Text is available on the [Thomas website](#). October 21, 2002.

This newsletter is produced by the National Energy Technology Laboratory and presents summaries of significant events related to carbon sequestration that have taken place over the past month.

If you'd like to join the e-mail distribution list, please send a message to majordomo@list-manager.netl.doe.gov with "subscribe sequestration" in the body of the message. We encourage you to pass this along to those whom you believe will be interested.

Contact: Scott Klara, klara@netl.doe.gov, or visit the website at www.netl.doe.gov/coalpower/sequestration/.