



THE CARBON SEQUESTRATION NEWSLETTER

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Sequestration in the News

NETL Carbon Sequestration Program Management Change. Chuck Schmidt, Product Manager of the Carbon Sequestration Program since its inception in 1998, recently moved to the Office of Science and Technology as the new Director of the Clean Air Technology Division, which includes a Carbon Sequestration Focus Area. Scott Klara will assume Chuck's former position as Product Manager for the Carbon Sequestration Program. Scott has extensive industry and government experience in the energy field.

Weyburn Field EOR. Canadian public television recently aired a segment on the Weyburn enhanced oil recovery project. The project involves importing CO₂ from a synthetic fuel factory in North Dakota and injecting the CO₂ into the aging Weyburn reservoir 320 kilometers north in Saskatchewan. "[Production at Saskatchewan oil field up due to innovative idea](#)," *The National, CBC-TV*, March 22, 2002.

Capturing CO₂ from Air. Researchers from Los Alamos National Laboratory (LANL) are developing a process to extract CO₂ from air using a chemical cycle (e.g. quicklime to calcium carbonate). The current cost of the process is roughly equivalent to 20 cents per gallon of gasoline. The research was presented at the annual meeting of the American Chemical Society in Orlando. "[Researchers Look to Mop Carbon Dioxide from Air](#)," *Environment News Service*, April 10, 2002.

BP Benefits from Early Reductions. BP sold 1,000 carbon credits to IMERYS, the international white pigments processing group, using the U.K.'s recently introduced emissions trading scheme. "[BP Makes First Emissions Trades](#)," BP, April 10, 2002.

California Greenhouse Gas Legislative Proposal.

The California State Senate will consider Assembly Bill 1058, which recently passed the state assembly. The measure would empower the California Air Resources Board to adopt standards for controlling greenhouse gas emissions from new cars and light trucks. Regulations would take effect after 2006. "[California may limit greenhouse gases, hit SUVs](#)," *Reuters*, April 22, 2002.

Transporting CO₂ Over Sea. The Norwegian oil company Statoil's shipping division has engineered a tanker design that could help Norway meet CO₂ emission targets. The design will allow liquefied CO₂ to be carried from power plants to sites where it can be sequestered in enhanced oil recovery operations. The CO₂ would be transported under pressure at a temperature of -50 degrees C. "[Shipping CO₂ could help Norway hit Kyoto targets](#)," *Reuters*, April 23, 2002.

U.K. - U.S. Carbon Trade. The Pacific Forest Trust, a non-profit organization based in California, sold 7,500 tons of CO₂ emissions offsets to UK-based Future Forests, Ltd. Natsource LLC facilitated the international transaction, which was completed independent of a recognized international emissions trading system. The emissions offsets are based on conservation and long-term sustainable forest management, and are secured in perpetuity by a conservation easement. "[International Carbon Trade Mitigates Global Warming](#)," Natsource, April 22, 2002.

Non-linear CO₂ Absorption by Trees. A four-year experiment by researchers at Duke University found that trees in a 100% enriched CO₂ atmosphere (double today's concentration of 370 parts per million by volume) grew 27 percent faster than at control sites without CO₂ enrichment. This correlates to an absorption of only 10 percent of human-generated CO₂ in 2050, less than previously anticipated. *Oecologia*, "[Forest Experiment Questions Greenhouse Gas Strategy](#)," *New Scientist*, April 2002.

Clear Skies NPR Air-Time. NPR's Talk of the Nation featured a segment on President Bush's Clear Skies Initiative. Howard Herzog, of MIT's Laboratory for Energy and the Environment, was a guest of the show. The discussion focused on CO₂, mercury, particulate matter and sulfur emissions. *NPR*, April 26, 2002.

Rainforests May Balance Carbon Accounting. Scientists from the University of Washington, the University of California, and an Institute in Brazil, report that previous estimates of terrestrial carbon sequestration by ecosystems in the humid tropics may be overestimated, due to overlooked out gassing of CO₂ from rivers and wetlands. The authors suggest that the overall carbon budget of rainforests, summed across terrestrial and aquatic environments, appears close to reaching a carbon equilibrium. "[Out gassing from Amazonian rivers and wetlands as a large tropical source of atmospheric CO₂](#)," *Nature*, April 11, 2002.

ESI and Industry Reforestation Collaboration. Environmental Synergy, Inc. planted its 15 millionth tree in the Lower Mississippi River Valley as part of an ongoing effort to restore bottomland hardwood habitat to the area while sequestering CO₂. The reforestation program, implemented on behalf of companies like Dynegy, Inc., American Electric Power, ChevronTexaco, and the UtiliTree Carbon Company, has restored 55,000 acres of forests over the past three years. "[ESI Reforestation Effort Combats CO₂ Emissions](#)," *ESI*, April 2002.

Long-term Climate Modeling. Two articles in the April 25 issue of the journal *Nature* address climate change uncertainties. "Constraints on radiative forcing and future climate change from observations and climate model ensembles" and "Origins and estimates of uncertainty in predictions of twenty-first century temperature rise." *Nature*, April 25 2002.

USDA Symposium on Natural Resource Management to Offset Greenhouse Gas Emissions. [The USDA Symposium](#) will be held November 19-21 in Raleigh, NC. Researchers will present recent research on management options for increased carbon storage, innovative technologies and methodologies for monitoring and measuring terrestrial carbon stocks, economic projections, and a panel discussion of policy implications of scientific carbon research findings. Abstracts will be accepted until July 1.

Green Trading Summit: Emissions, Renewables and Negawatts. [The Green Trading Summit](#), held May 14 -15, 2002 in New York City, will address solutions for reducing pollution and accelerating technology transfer, including new markets for trading GHG emission reduction credits, renewable energy credits and negawatts (reduction in use of electricity).

Office of Surface Mining Reforestation: Mined Land Reclamation. In a technical interactive forum on May 15 to 16 2002, the U.S. Department of Interior Office of Surface Mining (OSM) will examine methods to enhance post-mining land use plans that promote the planting of trees on active and abandoned surface coal mines. NETL is collaborating with OSM in this effort, specifically a joint reforestation initiative. "Office of Surface Mining Reforestation Initiative: [Market Based Approaches to Mined Land Reclamation and Reforestation](#)."

The Geological Society of America 2002 Annual Meeting. A special topic session entitled "[Experimental, Field, and Modeling Studies of Geological Carbon Sequestration](#)," will be held at The Geological Society of America 2002 Annual Meeting & Exposition October 27-30, Denver, Colorado. The session intends to bring Earth Scientists together from the experimental, field, and modeling perspectives. The deadline for abstract submission is July 16, 2002. For more information, contact Curt White, at curt.white@netl.doe.gov.

2002 Spring American Geophysical Union meeting. A special interdisciplinary session called "[Carbon Management Technologies: Feasibility, Impacts, Risks, and Economics](#)" will be held at the AGU meeting May 28 to 31 2002. The session will examine carbon management technologies.

CO₂ Trading 2002. Organized in association with the International Emissions Trading Association (IETA), "[CO₂ Trading 2002: the North American Market](#)" will be held June 18 to 20 2002 in Chicago, IL. *EyeforEnergy*.

Recent Publications

Coal-Seq I Forum. Presentations from the First International [Forum on Geologic Sequestration of CO₂ in Deep, Unmineable Coalseams](#) (Coal-Seq I) are now available to be viewed online. The forum, organized by Advanced Resources International, was held March 14 to 15 2002 in Houston, TX, and included presentations from the U.S., Canada, Japan, the Netherlands, and the U.K.

Physics of Enhanced Oil Recovery. A recent article on petroleum engineering mentions the Sleipner CO₂ enhanced oil recovery project as an example of a physical technique to exploit petroleum reservoirs in increasingly remote and complicated geological environments. "Physics in Oil Exploration," *Physics Today*, April 2002.

Enhanced Oil Recovery. The April *Oil and Gas Journal* features EOR in several articles, including "Special Report: Enhanced Oil Recovery," "CO₂ membrane technology matures," and "California steam EOR produces less; other EOR continues." *Oil & Gas Journal*, April 15, 2002.

NETL's Coal - Carbon - Oil Interface. A fact sheet on the capture of CO₂ from coal-based IGCC for use in enhanced oil recovery operations has been posted on the NETL website. "[Coal-Based IGCC Offers CO₂ Capture Benefits for Oil Recovery](#)," NETL, April 2002.

Input from Climate Policy Analysts. The current issue of the Brookings Review contains three articles on climate-related topics. The articles, "Climate Change After Kyoto: A Blueprint for a Realistic Approach," "Statehouse and Greenhouse: The States are taking the Lead on Climate Change," and "Three Pollutants and an Emissions: A Playbill for the Multipollutant Legislative Debate," address political and economic responses to climate change. *Brookings Review, Energy and the Environment*, Spring 2002.

Carbon Contracts. A new International Emissions Trading Association discussion paper presents a common starting point for carbon contracts in the carbon trading market. "[Carbon Contracts Cornerstones - Drafting Contracts for the Sale of Project-Based Emission Reductions](#)," IETA, April 2002.

O₂/CO₂ Recycle Combustion in Natural Gas Power Plants. A recent article by researchers in Canada investigates oxy-gas combustion techniques with flue gas recycle. The benefits include considerable reduction of NO_x emissions and improved plant efficiency. "CO₂ capture using oxygen enhanced combustion strategies for natural gas power plants," *Fuel*, March 2002.

Asia Pacific Economic Cooperation (APEC) CO₂ Focus. The Experts Group on Clean Fossil Energy under the APEC Energy Working Group recently released a report entitled "[Options to Reduce CO₂ Emissions from Electricity Generation in the APEC Region](#)." The report utilizes expertise and data from NETL's clean coal and carbon sequestration programs. EGCFE, December 2001.

EU-Wide Emission Trading Review. The Centre for European Economic Research and the Institute for Applied Ecology have reviewed the planned Directive on an EU-wide emissions trading scheme on behalf of the Ministry for the Environment and Transport of a German State. The review proposed two corrections, concerning criteria for national allocation plans and combined heat and power, but found that in general the proposed Directive is well-suited to the framework of the Kyoto Protocol, balancing various interests of involved stakeholders. *Okon Institut*, April 2002.

Economics of Capture and Sequestration with Gasification. An NETL technical report on CO₂ emissions and economic feasibility comparing coal-based Integrated Gasification Combined Cycle (IGCC) and Natural Gas Combined Cycle (NGCC) with and without capture and storage mechanisms finds that coal-based IGCC with CO₂ capture and sequestration would yield one fifth the specific carbon emissions and could be economically feasible if there were a market value for the captured CO₂, such as for enhanced oil recovery. "[Prospects for Early Deployment of Power Plants Employing Carbon Capture](#)" NETL, April 2002.

U.S. Greenhouse Gas Inventory Program ListServ. [EPA has established a listserve](#) for posting information related to GHG emissions and removals (i.e., sinks) inventories. The message postings will serve international, national, State, corporate, and facility GHG inventory practitioners and users. It is open to all those interested in GHG emissions (and sinks) data, and methodologies and systems used to develop inventories.

Legislative Activity

The Senate Energy Policy Debate Concluded. The Senate approved S517, the Energy Policy Act of 2002, on Thursday April 25th. The bill will go to conference and be melded with the House-passed version, HR 4, before being returned to the Senate for a revote and then submitted to the President. The Senate version and the House version both contain clean coal tax incentives. Both bills also contain provisions for fossil energy R&D, though the Senate version has more specific focus on sequestration, stating "the program shall emphasize carbon capture and sequestration technologies and gasification technologies." The Senate version also provides for new climate change offices within the White House and DOE, a National Climate Change Strategy, and a voluntary emissions registry. CO₂ capture and sequestration qualify as reductions in the voluntary emissions registry. If the registry fails to capture 60 percent of emissions after five years, the reporting could become mandatory. "[Senate Approves U.S. Energy Overhaul](#)," *Reuters*, April 25 2002.

Hearing on Climate Science. The House of Representatives Committee on Science held a hearing on new directions for climate research and technology initiatives on April 17, 2002. The purpose of the hearing was to address concerns and recommend directions for the US Global Change Research Program. Witnesses included three experts from academia, a representative from the National Labs, and one expert from the Center for Neighborhood Technology. [Committee on Science](#).

This newsletter is produced by the National Energy Technology Laboratory (NETL) to provide information on recent activities and publications related to carbon sequestration. It covers domestic, international, public and private sector news from primary and secondary news sources.

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If you would like to know more about DOE's Carbon Sequestration R&D Program, please contact Scott Klara at NETL, scott.klara@netl.doe.gov.

www.netl.doe.gov/coalpower/sequestration/