

THE CARBON SEQUESTRATION NEWSLETTER

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

January 2005

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Sequestration in the News

Chemical & Engineering News, "Putting a Lid on Carbon Dioxide." Provides a comprehensive assessment of carbon sequestration and clean-coal research as it relates to the government's climate change strategy. Explores everything from the basics of capture and storage science to the economics, including discussion of the technologies, infrastructure, commercial applications, and field tests. December 20, 2004, <http://www.cen-online.org> (subscription required)

Pittsburg Post-Gazette, "Greenhouse gasbags / It's time for U.S. to get ahead of Kyoto-style emission controls, which surely are coming." According to this article, some members of Congress have resisted limits on carbon emissions, thinking that coal industry jobs would be jeopardized if carbon emissions caps were to encourage power plants to switch to cleaner burning fuels such as natural gas. Author Joseph Otis Minott, executive director of Clean Air Council, argues that a more realistic scenario is that coal-burning utilities would get the market signals they need to modernize their power plant fleet. Many experts predict that even with carbon capture and sequestration in place, coal will still be the cheapest electricity generating option. December 28, 2004, <http://www.post-gazette.com/pg/04363/433272.stm>

China Daily, "Progress made in CBM recovery technology." China has achieved an initial success in using carbon dioxide enhanced coalbed methane (CBM) recovery technology to tap the country's huge CBM resources. Sun Maoyuan, president of China United Coalbed Methane Co Ltd, said a small pilot test carried out with the technology in a single CBM well in the south Qinshui basin of North China's Shanxi Province has been successful. The test was completed earlier this year with a total of 193 tons of carbon dioxide injected into the targeted coal seam of the CBM well. China is estimated to have between 30 trillion and 35 trillion cubic meters of coalbed methane resources, which are located about 2,000 meters underground. December 11, 2004, http://www.chinadaily.com.cn/english/doc/2004-12/11/content_399399.htm

World Gas Intelligence, "Gas Projects Provide Catalyst for Carbon Sequestration." Article explores the link between gas production operations and commercial carbon capture and storage projects. Said Scott Klara, sequestration technology manager at DOE/NETL, "Carbon Sequestration's practical link to gas-producing fields is unlikely to shift greatly in the near future, mainly because separating CO₂ from gas streams is relatively straightforward and inexpensive – around \$1-\$2 per ton – so as yet is not commercially viable." The article highlights Statoil's Sleipner West field, Statoil/BP's In Salah field in Algeria, Statoil's Snohvit LNG project – scheduled to become operational in 2007, the ChevronTexaco-led Gorgon LNG venture in Australia, and a possible project on Alaska's North Slope – proposed by BP, ConocoPhillips, and Exxon Mobil. December 1, 2004, http://www.energyintel.com/PublicationHomePage.asp?publication_id=10 (subscription required)

DOE/FE Techline, "CO₂ Injection Boosts Oil Recovery, Captures Emissions." Until recently, enhanced oil recovery using CO₂ has not been economically feasible in Kansas because CO₂ sources were hundreds of miles away. A newly initiated CO₂ EOR flood at the Hall-Gurney field uses waste CO₂ from the fermentation process of a 25-million gallon per year corn ethanol plant. Waste heat from a 15-megawatt natural-gas-fired turbine generator provides thermal energy for the ethanol plant. January 3, 2005, http://fossil.energy.gov/news/techlines/2005/tl_kansas_co2.html

The Christian Science Monitor, "New coal plants bury 'Kyoto'." China, India, and the US are planning to build nearly 850 new coal-fired plants, which would pump up to five times as much carbon dioxide into the atmosphere as the Kyoto Protocol aims to reduce. "If all those power plants are online by 2012, then obviously it completely cancels out any gains from Kyoto," said Gavin Schmidt, a climate modeler with the Goddard Institute for Space Studies. "The point is that a relatively small number of countries hold the fate of the planet in their hands in terms of climate change," said David Hawkins, director of the Natural Resources Defense Council's climate center. "If the five or six countries building all these power plants were to come together to develop a strategy for carbon capture applied to coal, it would be a huge step toward cutting global warming." December 23, 2004, <http://www.csmonitor.com/2004/1223/p01s04-sten.html>

Sequestration in the News, Cont'd

Harvard University Gazette, "Experts take on climate change." A panel on possible future steps to combat climate change discussed embracing market-based incentives for carbon dioxide reductions and starting a new dialogue between the world's two biggest carbon dioxide emitters - the United States and China. The biggest question now, said Daniel P. Schrag, Professor of Earth and Planetary Sciences at Harvard, is how to replace the billions of tons of coal that appear likely to fuel development in China and India, two populous nations that are rapidly industrializing. Harvard President Lawrence H. Summers encouraged an increase in funding for basic research into technological solutions that will allow the removal of excess carbon from the atmosphere, such as proposals to bury it underground or under the sea. "The one thing that everybody should be able to agree on is the importance of basic research on clean energy use and sequestration," Summers said. December 16, 2004, <http://www.news.harvard.edu/gazette/2004/12.16/01-gore.html>

The Washington File, Four-Part Series on CSLF. The first article entitled, "International Effort Under Way on Emissions-Reducing Technology," focuses on the basics of the greenhouse effect and carbon capture and storage, and it also discusses the emergence of the Carbon Sequestration Leadership Forum. Part two, "Carbon Sequestration Technology Could Help Slow Global Warming," examines the Weyburn Carbon Dioxide Monitoring Project and the Frio Brine Pilot Experiment. The third article, "International Forum Tackles CO₂ Emissions from Power Plants," cites examples of international engagement. Mentions the CO₂SINK project in Potsdam, Germany and the Australian effort to address the regulatory and legal questions associated with CO₂ storage. Part 3 also highlights the CSLF technology roadmap and the Climate Stewardship Act of 2003. The final part in the series, "International Forum Tackles Carbon Dioxide Emission Problem," summarizes the CSLF ministerial meeting in Melbourne, Australia. Part 1, December 13, 2004: <http://usinfo.state.gov/gi/Archive/2004/Dec/13-874520.html>
Part 2, December 14, 2004: <http://usinfo.state.gov/gi/Archive/2004/Dec/15-595073.html>
Part 3, December 15, 2004: <http://usinfo.state.gov/gi/Archive/2004/Dec/16-627676.html>
Part 4, December 16, 2004: <http://usinfo.state.gov/gi/Archive/2004/Dec/17-674101.html>

The Herald-Dispatch, "Cleaning up coal might fuel debate." Discusses the report by the National Commission on Energy Policy which suggests an energy future where coal plays an important role. The report - which addresses everything from the security of oil supplies, to climate change, to fuel-economy standards - suggests Congress invest \$7 billion over the next 10 years, partly in existing clean-coal technologies and partly in tax breaks to encourage more companies to adopt technology that will clean up coal-fueled emissions. Said Luke Popovich, spokesman for the National Mining Association, "The race coal is in is not against other fuels. It's against the environmental expectation of Americans." Popovich continued, "The only way to do that is to rely on technology to continue to drive emissions down." December 29, 2004, <http://www.herald-dispatch.com/2004/December/29/LNtop1.htm>

Belfast Telegraph, "Kyoto will not work, warns climate expert." The struggle by developed countries to cut back their emissions of carbon dioxide will always be overtaken by the rising new emissions of the developing nations, led by China and India, who are not parties to the Kyoto treaty, said Professor Wallace Broecker of Columbia University. Extracting CO₂ directly from the air, liquefying it and then storing it, he said, offered the only realistic hope of preventing climate change that would be catastrophic for the world. "Alternative energy and energy conservation ... are going to fall far short of stopping the build-up of CO₂," he said. "But extracting CO₂ direct from the air can do the job." December 9, 2004, <http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=12243>

Announcements

"DOE Asks Regional Partners to Validate Carbon Sequestration Technologies." The Department of Energy is soliciting proposals for the second phase of its Regional Carbon Sequestration Partnerships program. The solicitation will provide up to \$100 million over 4 years in federal funds for partnerships of state agencies, universities, private companies, and national laboratories that will field test and validate promising carbon sequestration technologies. "When the Regional Carbon Sequestration Partnership program was initiated two years ago, these regionally-focused efforts were envisioned as the centerpiece of our carbon sequestration program," said Secretary of Energy Spencer Abraham. "This new solicitation says they have lived up to their promise by helping us determine the technologies, permitting requirements, and infrastructure best suited for specific regions of the country." *U.S. Newswire*, December 14, 2004, <http://releases.usnewswire.com/GetRelease.asp?id=40681>
Additional information about the "Regional Carbon Sequestration Partnerships - Phase II" solicitation, including application instructions, is available on the NETL business solicitation website at <http://www.netl.doe.gov/business/solicit/index.html>

"Climate Change Pilot Launches Final Auction, Opens Competitive Bidding on \$5 Million." The Canadian government is calling for new proposals in the final round of the Pilot Emission Removals, Reductions and Learning (PERRL) Initiative, which has successfully encouraged cost-effective greenhouse gas emission reduction and removal projects in forestry, renewable energy, and landfill gas. PERRL is now offering \$5 million for new projects in these areas, as well as in CO₂ capture and geological storage, and carbon sequestration in agricultural soils. Through PERRL, the Government of Canada purchases GHG emission reductions and removals from qualified projects on a lowest-cost-per-tonne basis. *Canadian Press Release*, December 17, 2004, http://www.ec.gc.ca/press/2004/041217_n_e.htm

“Human contribution to the European heatwave of 2003.”

This study estimates the contribution of human-induced increases in atmospheric concentrations of greenhouse gases and other pollutants to the risk of the occurrence of unusually high mean summer temperatures throughout a large region of continental Europe. The authors estimate it is very likely that human influence has at least doubled the risk of a heatwave exceeding the mean summer temperatures of 2003. *Nature*, December 2, 2004, <http://www.nature.com/cgi-taf/DynaPage.taf?file=/nature/journal/v432/n7017/index.html> (subscription required)

Related articles appearing during the month are as follows:

“Global Warming Has Doubled Risk of Fatal Heat Waves, Study Says,” *Bloomberg*, December 1, 2004, http://www.bloomberg.com/apps/news?pid=10000103&sid=axl8L7_u59E0&refer=us#

“Heatwave Study May Fuel Global Warming Lawsuits,” *Reuters*, December 2, 2004, <http://enn.com/today.html?id=523>
 “Heat wave risk rising with emissions,” *The Christian Science Monitor*, December 2, 2004, <http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=12084>

“The cloud conundrum.” Short article summarizes work conducted in response to the analysis of the effect of airborne particulate matter on clouds. Climate modelers are unsure of the degree to which aerosols may have been dampening the full climate effects of increasing atmospheric greenhouse gas concentrations. Such effects could push future global temperatures to the high end of the range. The author states that, although the net effects of aerosols remain unquantified, some of the worst case scenarios have been eliminated. *Nature*, December 23/30, 2004, <http://www.nature.com/cgi-taf/dynapage.taf?file=/nature/journal/v432/n7020/index.html> (subscription required)

“Abrupt Temperature Changes in the Western Mediterranean over the Past 250,000 Years.”

A continuous high-resolution Western Mediterranean sea surface temperature record spanning the past 250,000 years shows that abrupt changes were more common at warming than at cooling. Some of the most prominent events occurred after prolonged warm periods of high stability. *Science*, December 3, 2004, <http://www.sciencemag.org/content/vol306/issue5702/index.shtml> (subscription required)

Policy

“Europe Seeks New Accords With U.S. on Global Warming.”

According to this article the European Union is seeking new agreements with the U.S. to slow climate change without relying on the Kyoto Protocol. Said Paula Dobriansky, U.S. under secretary of state for global affairs, at the United Nations conference on climate change in Buenos Aires, “The U.S. is ‘committed’ to the UN Convention on Climate Change it signed, which calls for voluntary reductions in greenhouse gases. One important goal is agreements with other governments to develop and promote technology to reduce emissions, such as separating and injecting carbon dioxide from coal burning power plants into the earth.” *Bloomberg*, December 15, 2004, http://www.bloomberg.com/apps/news?pid=10000086&sid=a2kmax6pOOV8&refer=latin_america#

“Temporary Sequestration Credits: An Instrument for Carbon Bears.”

Temporary crediting of carbon storage is a proposed instrument that allows entities with emissions reductions obligations to defer some obligations for a fixed period of time. According to this study, temporary carbon storage credits must sell at a discount compared to a permanent credit because the user of the temporary credit takes on the liability of renewing it, or replacing it with a permanent credit. The authors show that the discount depends on the expected change in price of a permanent credit. Temporary credits have value only if restrictions on carbon emissions are not expected to tighten substantially. *Climate Policy* 4 (1, 2004): 65-74.

US power companies set voluntary GHG targets. A group comprised of seven US power organizations and companies have signed a voluntary agreement with the Department of Energy to reduce their greenhouse gas emissions intensity. The group has signed a Memorandum of Understanding to cut their emissions per unit of output by an equivalent of 3 to 5 percent below 2000-2002 baseline levels, as measured over the 2010-2012 period. “Department of Energy-U.S. Power Sector Sign MOU on Voluntary Efforts to Reduce Greenhouse Gas Emissions,” *U.S. Newswire*, December 13, 2004, <http://releases.usnewswire.com/GetRelease.asp?id=40642>

“Cinergy Releases Report on Potential Impact of Greenhouse Gas Regulation.”

“We are planning the future of our company around our belief that we will eventually be required to operate in a carbon-constrained world,” said James E. Rogers, chairman, president and chief executive officer of Cinergy. Cinergy said in a report on its climate strategy that it expected a carbon-constrained future and that the McCain-Lieberman Climate Stewardship bill is aligned to its own position on mandatory caps on greenhouse gases. Cinergy said complying with a carbon dioxide cap would not incur large new expenditures beyond the cost of complying with upcoming emissions caps on sulfur dioxide and nitrogen oxides. *Business Wire*, December 1, 2004, http://home.businesswire.com/portal/site/google/index.jsp?ndmViewId=news_view&newsId=20041201005742&newsLang=en

“Edison International Asks Regulators to Address Global Warming on a National Level.”

“A deliberate and coordinated effort is needed to reduce greenhouse gas emissions across the entire energy sector,” said John Bryson, chairman of Edison International. “Neither greenhouse emissions nor electricity stop at state borders. We believe the broader view can lead to a new national policy on global warming.” Edison advocates developing policies to reduce greenhouse gas emissions based on a comprehensive consideration of renewable energy and low carbon-emitting technologies, energy conservation and energy efficiency programs, conventional generation, and new carbon-dioxide emission-removal technologies. *Business Wire*, December 7, 2004, http://home.businesswire.com/portal/site/google/index.jsp?ndmViewId=news_view&newsId=20041207005683&newsLang=en

"Industry concerns get increased attention at COP-10."

Executives from a wide range of companies at the conference say business interest in climate change issues is on the uptake and policymakers at the conference seem more prepared to listen to their concerns this year. At previous COP meetings, it was primarily power utility executives representing the business community. But recently, attendees from energy-intensive industries, chemical companies, and other industries likely to be the most affected by carbon dioxide regulations have begun attending. At some side events, business representatives provided their thoughts on specific policy matters. *Greenwire*, December 15, 2004, <http://www.sustain-online.org/plugins/DocSearch/details.asp?MenuId=1&ClickMenu=&doOpen=1&type=DocDet&ObjectId=MTIzMDU>

"Australia distances itself from US climate change policy."

Australian Environment Minister Ian Campbell made moves to distance the Australian government's views from US policies on linking production to carbon emissions in order to reduce greenhouse gas emissions. Campbell reportedly told *The Age* newspaper that Australia did not agree with US policies of relative targets i.e., reducing each unit of CO₂ per unit produced, which the US claims curbs relative emissions while protecting economic growth. *Point Carbon*, December 22, 2004, <http://www.pointcarbon.com/article.php?articleID=5832&categoryID=147>

Also see, "Australia draws line with United States on global warming: report," *Terra Wire*, December 20, 2004, <http://www.terradaily.com/2004/041220025632.4fgeexIn.html>

"UK initiative on climate change." Tony Blair is to host a major scientific conference on climate change in February as part of an attempt to create an international consensus on the science involved and so lock the US and the G8 group of industrial nations into action beyond the Kyoto protocol. He believes the G8 can reach agreement on improving energy efficiency and expediting the uptake of existing low carbon technologies such as photovoltaic technology, fuel cells, and carbon sequestration. *The Guardian*, December 10, 2004, <http://politics.guardian.co.uk/green/story/0,9061,1370510,00.html>

"China defends economic growth at climate conference."

Speaking at the UN climate change conference in Buenos Aires, a top official of the Chinese foreign ministry, Gao Feng said, "We are a developing country, we're not yet making international commitments. We will continue to attend to our energy needs. We will need to increase our energy consumption for the next 30 to 50 years." Gao continued, "People are saying, you'll have to curb your energy needs... that developing countries must curb their energy needs, I cannot accept that, it is something totally wrong." Gao noted that China's per capita CO₂ emissions were only one eighth of US emissions. According to Gao, US participation in any accord is necessary before any post-Kyoto agreement is considered by China. *Xinhua Financial Network News*, December 14, 2004, <http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=12286>

Washington State may adopt California emissions standards.

According to this article, State Representative Ed Murray is planning to introduce a bill requiring vehicles sold in Washington to meet the stricter emissions standards California has approved. The bill will receive Governor Gary Locke's endorsement as part of a farsighted global warming package of proposals he will make. "Slowing global warming," *Seattle Post-Intelligencer*, December 6, 2004, http://seattlepi.nwsource.com/opinion/202409_cared.html

Technology

"Carbon sequestration: a new road to Kyoto."

Discusses the economics of carbon capture and sequestration. According to this article, at present, the only economically viable way of trapping CO₂ that would otherwise be released into the atmosphere is through its removal from freshly produced natural gas and injection back into depleted production fields. The article also states that while limiting CO₂ emissions remains the principal tool of achieving the Kyoto targets, trapping previously emitted CO₂ could also emerge as a viable alternative. *Datamonitor*, December 3, 2004, http://www.commentwire.com/commwire_story.asp?commentwire_ID=6182

"Using CaO- and MgO-rich industrial waste streams for carbon sequestration."

This study examines a possible carbon capture and sequestration technology for the cement and steel industries. CaOH₂ and CaO from steel slag or concrete waste can be dissolved in water and reacted with CO₂ in ambient air to capture and store carbon safely and permanently in the form of stable carbonate minerals (CaCO₃). An example process scheme is presented. The operating cost is estimated to be US\$8/t-CO₂ sequestered. *Energy Conversion & Management*, 46 (March 2005) 687-699, <http://www.sciencedirect.com/science/journal/01968904>

"Carbon dioxide removal in power generation using membrane technology."

Evaluates membranes for CO₂/H₂ separation in which CO₂ is contained in the permeate gas. Evaluates systems with CO₂/H₂ selectivities of 6.4 to 9. Modeling effort predicts significant H₂ loss and large membrane area requirements. Author concludes membranes only cost competitive with CO₂ concentrations in syngas greater than 10%. *Energy* 29 (Oct-Dec 2004) 2025-2043, <http://www.sciencedirect.com/science/journal/03605442>

Terrestrial

"Trees Could Cut Global Warming."

A team of researchers from CSU-Monterey Bay and NASA Ames Research Center in Menlo Park estimates that a fifth of the carbon dioxide released annually from fossil-fuel emissions could be sequestered by planting groves of trees on marginal agricultural and rangeland areas. Controlling infestations of insects that kill trees is key. "The dead trees not only are no longer trapping carbon dioxide," says Christopher Potter of NASA, "but the decaying process emits even more." *Monterey County Herald*, December 17, 2004, <http://www.montereyherald.com/mld/montereyherald/10439451.htm>

“Entergy to Purchase One Million CO₂ Credits Through Blue Source.” Entergy is exercising an option to purchase one million CO₂ emission reduction credits, representing the largest geologic CO₂ sequestration purchase within the United States. This purchase is an extension of the initial transaction between Entergy and Blue Source, which was completed in December of 2003. This project, however, directly deposits the carbon emissions back into dormant oil wells to recover oil deposits currently untapped by conventional extraction techniques. *PR Newswire*, December 20, 2004, <http://www.prnewswire.com/cgi-bin/stories.pl?ACCT=109&STORY=/www/story/12-20-2004/0002669420&EDATE>

“Industry fears CO₂ trading will lead to surge in electricity prices.” A coalition of power intensive industries - including iron & steel, glass, non-ferrous metals, alloys, cement, ceramics, paper, and lime - have warned against a surge in electricity prices due to the entry into force of the EU carbon emissions trading scheme in January 2005. The coalition blames the lack of competition in the European power market, which will result in power companies passing on the costs of allowances to energy intensive industries. *EurActiv.com*, December 14, 2004, <http://www.wbcd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=12306>

EU CO₂ trading “will force firms out of Europe.” Two French business leaders have predicted that industry will be forced out of Europe by the EU greenhouse gas limits and carbon dioxide emission trading. In a front page article in *Le Monde* newspaper on December 11, Bertrand Collomb of cement producer Lafarge and Guy Dollé of steelmaker Arcelor allege that the European Commission has failed to harmonize national plans for the scheme. They criticize the exclusion of transport and households - both big CO₂ emitters - and the fact many industrial companies are also not covered, producing discrimination. *Environment Daily*, December 16, 2004, <http://www.environmentdaily.com/articles/> (subscription required)

“EU climate emission trading to start four short.” The EU's carbon dioxide emission trading scheme will begin in January with only 21 of its 25 member states participating, European environment commissioner Stavros Dimas said. National emission allowance allocation plans (NAPs) for four countries - Greece, Italy, Poland, and the Czech Republic - will not get Commission approval before the scheme goes live. *Environment Daily*, December 10, 2004, <http://www.environmentdaily.com/articles/> (subscription required)

January 13-14, 2005, **Climate Change Risks & Opportunities: Learning from the Leaders**, New York, NY. The conference will be divided into three blocks: Expert Briefings on the scientific basis for climate change mitigation and emerging policy frameworks; Corporate Spotlight on the business case for action on climate change and how leading companies have responded; and Interactive Workshops with industry leaders and policymakers to assist companies with integrating climate change into their strategic planning. Contact the Center for Economic and Environmental Partnership, Inc. in New York (Robyn Stewart, robyn@ceepinc.org, +1 518 432 6400) with any questions you might have.

January 16-20, 2005, **Chapman Conference on the Science and Technology of Carbon Sequestration**, Bahia Resort Hotel, San Diego, CA. The goal of this conference is to bring together scientists, engineers, and others who study long-term sequestration of carbon as a way of reducing potential global warming. For more information see <http://www.agu.org/meetings/cc05acall.html>

March 21-24, 2005, **Third USDA Symposium: Greenhouse Gases and Carbon Sequestration in Agriculture and Forestry**, Baltimore, MD. This symposium will provide a forum for scientists to present recent developments in science and technology relevant to storing carbon and addressing greenhouse gases in managed terrestrial ecosystems. For details, registration, and electronic abstract submission forms, see <http://soilcarboncenter.k-state.edu/conference>. Deadline for abstract submission is February 1, 2005.

April 13-15, 2005, **European CO₂ Capture and Storage Conference – Towards Zero Emission Power Plants**, Brussels. A high-level international conference organized by the European Commission. Attendance is free, but will be by invitation only. To submit your intention to participate, please visit the following web-site http://scic.cec.eu.int/scic/owa/WEB_MTKF.reg_form?confID=04RDTCO2

June 19-22, 2005, **2005 American Association of Petroleum Geologists Annual Convention**, Calgary, Canada. The purpose of this combined oral and poster session is to bring together researchers active in the field of CO₂ and acid gas injection in oil and gas reservoirs, coal beds, and deep saline aquifers - whether for EOR, ECBM or sequestration - to present current operations, field and laboratory experiments, and integrated studies for the evaluation of sequestration sites and the long-term fate of the injected gases. For more information about the meeting and submission of abstracts please visit <http://www.aapg.org/calgary/technical/index.cfm>

Recent Publications

National Commission on Energy Policy Report Released.

The report contains detailed policy recommendations for addressing oil security, climate change, natural gas supply, the future of nuclear energy, and other long-term challenges. The Commission's recommendations for coal included: Providing \$4 billion over ten years in early deployment incentives for IGCC coal technology; Providing \$3 billion over ten years in public incentives to demonstrate commercial-scale carbon capture and geologic sequestration at a variety of sites. Said William K. Reilly, former EPA Administrator, "Coal's abundance in the United States, and in major developing countries like China and India, makes finding clean ways to use it among our highest priorities. Coal gasification, when combined with carbon sequestration, has the potential to revolutionize energy production." "Bipartisan Commission Issues Strategy to Address Long-Term U.S. Energy Challenges," *PR Newswire*, December 8, 2004.

<http://www.prnewswire.com/cgi-bin/stories.pl?ACCT=109&STORY=/www/story/12-08-2004/0002590358&EDATE>

The report entitled, "Ending the Energy Stalemate: A Bipartisan Strategy to Meet America's Energy Challenges," is available for download at <http://www.energycommission.org>

"The costs of mitigating carbon emissions in China: findings from China MARKAL-MACRO modeling."

In this paper an integrated energy-environment-economy model is used to generate China's reference scenario for future energy development and carbon emissions through the year 2050. The results show that China's primary energy consumption is expected to be 4818 MtCe with carbon emissions of 2394MtC by 2050. Carbon intensity per GDP is expected to decrease at an annual rate of 3% during the period 2000–2050. Marginal abatement cost curves of carbon for the year 2010, 2020, and 2030 are also derived from the model. *Energy Policy*, 33 (May 2005) 885-896, <http://www.sciencedirect.com/science/journal/03014215>

"On the Integration of Carbon Capture and Storage into the International Climate Regime."

This article analyzes the potential integration of Carbon Capture and Storage (CCS) in the international climate regime. Utilizes experiences from the Land use, Land-use change and Forestry (LULUCF) sector to argue that CCS can only be accounted for in a transparent and comprehensive way. Discusses accounting problems associated with cross-border projects, which arise due to the geographical separation of the capture and storage site. An economic analysis is conducted considering the consequences of non-permanent storage. The study suggests that CCS is not as attractive as widely claimed. *Hamburg Institute of International Economics*, Discussion Paper 303, 2004, available for download at http://www.hwwa.de/Publikationen/Discussion_Paper/2004/303.pdf

"Bottom-up approaches for defining future climate mitigation commitments." This report analyses a number of alternative, bottom-up approaches, i.e. technology and performance standards; technology research and development agreements, sectoral targets, etc. While bottom-up approaches are concluded as being valuable components of a future climate regime, they do not seem to offer a real alternative to emission reduction and limitation targets, as they provide little certainty about the overall environmental effectiveness of climate policies. *RIVM* report 728001029/2004. The report can be downloaded at <http://www.rivm.nl/ieweb/ieweb/Reports/728001029.pdf>

Cinergy Releases Report On Potential Impact Of Greenhouse Gas Regulation.

Cinergy Corp. released its report entitled, "The Air Issues Report to Stakeholders," on the potential impact of regulation of greenhouse gas emissions on the operation of its electric generating system. The full report can be downloaded at http://www.cinergy.com/pdfs/AIRS_12012004_final.pdf

Legislative Activity

Congress approved the \$388 billion omnibus spending bill.

The President's Coal Research Initiative received \$273 million, of which \$45 million is devoted to Sequestration R&D. The overall 2005 budget for DOE's Fossil Energy program is \$640.2 million, which is a reduction from the 2004 appropriation of \$804.8 million. To view a summary table of DOE's Fossil Energy budget for fiscal year 2005 visit http://fossil.energy.gov/aboutus/budget/05/Budget_Table_-_FY2005.html

Rhode Island Adopts California Emission Standards.

Governor Donald L. Carcieri announced that the Department of Environmental Management filed regulations that adopt the latest California Low Emission Vehicle II (LEV II) vehicle emission standards for new vehicles sold in Rhode Island beginning with model year 2008. The standards require that 10 percent of the autos and light trucks be so-called zero-emission vehicles. Rhode Island joins Connecticut, Massachusetts, Vermont, Maine, and New York in adopting the California program. New Jersey is in the process of adopting the California standards. "Governor Carcieri Announces Adoption of California Emissions Standards for Rhode Island," *RI Department of Environmental Management Press Release*, December 21, 2004, <http://www.state.ri.us/dem/news/2004/pr/1221042.htm>